Railway Mechanical Engineer

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Volume 92 October, 1918 No. 10

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Subscribe In 100 Per Cent Amounts

"One hundred per cent subscriptions and one hundred per cent amounts." That is the goal toward which railwaymen must work in the Fourth Liberty Loan campaign. The country must raise between September 28 and October 19, $6,000,000,000 in 4¼ per cent Liberty Bonds, double the amount that was raised in the Third Campaign. Railwaymen will play a big part in the present drive. They are being given a chance to subscribe on a partial payment plan, whereby payments may be deducted from their salaries in eight monthly installments, the eight months' period not beginning, in the case of those who are still paying on their Third Loan Bonds, until the first of the year. There are general committees, terminal committees, office committees, division committees, shop committees through which every man in railway service will be reached and asked to take a bond. There is every hope that every man will subscribe—thereby making a perfect record of 100 per cent subscriptions. But that will not be enough. In the first loan railwaymen subscribed creditably, in the second loan they doubled their totals in the first loan, and in the third loan they considerably more than doubled their totals in the second loan. Are they going to double their third loan totals in the fourth loan? They can and must, to keep up their most enviable record. Bear these facts in mind when *you* subscribe and tell your men when you ask *them* to subscribe. Liberty Bonds are the best securities in the world! To show what you think of the Hun who hits below the belt, who sinks hospital ships, who bombs hospitals, who destroys places of worship, who murders women and children, who cries "Kamerad" and then shoots and stabs, who—but why go on with the endless list—YOU WILL SUBSCRIBE! And to show your respect for those brave Yanks who have gone over there to stop these things you will do more—you will lend the way our soldiers fight—you will buy Liberty Bonds to your UTMOST.

There Is No Place on Railroads for Slackers

The regional director for the Pocahontas region has issued a circular to all employees with the statement, "Slackers have no place in this region," and calls attention to the fact that the responsibilities of railroad employees under federal control have changed only in that they have been increased. This message should be carried from one end of the country to the other. There will be a very strong tendency on the part of some of the men to take advantage of the increase in wages with the accumulated back pay in treating themselves to a "good" vacation. The mechanical department employee particularly, while he is getting more money, is duty bound to work to his utmost. At the present time this nation is "long" on money and "short" on time and production. The mechanic is in greater demand than ever before in the history of this country. He is receiving higher wages than were even dreamed of two years ago. It is no time for him to lay down on the job. He must come across and deliver the goods as every "doughboy" is compelled to do on his $30 a month. It is easy for a man to say, "A couple of days off this week will never be felt," but as the many hundreds of thousands of $50 Liberty Bonds have gone to make our Liberty Loans a success, just so that man's couple of days will contribute to make this na-

tion's efforts a success. Tie the work of the men at home to the work of the boys in the trenches. Get every one to realize how much depends upon his own individual effort. If this is done, it will be possible to make the message of the regional director to his men read, "There are no slackers in this region."

Fuel Conservation in Stationary Plants

With the nation facing a fuel shortage of approximately 75,000,000 tons of bituminous coal this year, with the increasing demands of the war industries for fuel with which to generate power to manufacture the war supplies, and with the increasing demands for fuel by our allies, it behooves every railroad man to do his utmost to conserve fuel. The Fuel Conservation Section of the Railroad Administration, appreciating the conditions in the stationary plants on American railways, is making a hard drive in this field. At a meeting of railway men responsible for fuel used on other than locomotives, held in Chicago during the month and which is reported elsewhere in this issue, several concrete suggestions were made for saving fuel. The railroads use such a vast quantity of fuel and it appears to be so plentiful, that it takes considerable mental effort for one to make himself realize the necessity for saving. The various ramifications of fuel economy have been overlooked. In the past but few have looked upon a leaky air line as a fuel waster. But few have thought of lagging steam pipes in an endeavor to save fuel. Very few have considered what wasted power, unnecessary lights, improperly maintained buildings, poor boiler installations and the like mean to the coal pile. The real effort will be in getting everyone to realize how important it is to consider *all* of these things. The conditions are such that expenditures which in the past were believed to be unwarranted must be made in order to save fuel. We must no longer look upon fuel as worth so much money, but we must consider it from the standpoint of what it will do to increase our productiveness and thus helping to win the war.

Box Car Doors Need Attention

No one who observes the condition of freight equipment can fail to notice the large per cent of box cars with defective side doors that are now in service. From the standpoint of the car repair foreman this is a minor matter, as door repairs are not difficult to make and do not involve much expense. From the shippers' viewpoint, however, this is a serious defect, as there are very few commodities shipped in box cars which do not require good door protection.

The reinforcing of car doors is a matter that has received considerable attention in the past. The Master Car Builders' Association has repeatedly urged the adoption of door stiffeners and adequate door fixtures. The present deplorable condition can only be laid to the indifference of the roads. Some roads, to be sure, have put the doors on their old box car equipment in good condition. If all had done what they could along this line there would be fewer cars running now with boards nailed to the bottom corners of the doors to hold them in the guides and cleats to keep them shut. Door hasps with short fasteners and poorly attached shoes and strips at the bottom of the doors are two features responsible for a great deal of trouble. Among the other things that should be corrected are tracks that allow the rollers to become misplaced or the door to be jarred out of the bottom guides. Horizontal stiffeners and burglar-proof bottom guides should be applied to cars not already so equipped. The loading of cars without adequate side door protection is responsible for considerable damage to doors. This, of course, can only be overcome by a campaign of education among the shippers.

The question of providing side doors of substantial construction is important as a means of making box cars suitable for all kinds of lading and thus increasing the operating efficiency of the railroads. The amount of steel required for the work is almost negligible and every road should carry on the reinforcing of doors as rapidly as possible.

Save Paper Is the Order of the Day

The War Industries Board in an endeavor to conserve the paper supply of the country has ordered the various publishers to cut down the use of paper for their publications 10 per cent, beginning September 15. It has formulated some rather drastic measures, as will be noted in the announcement at the beginning of our general news section. None but bona-fide paid subscribers and advertisers are to be furnished, regularly, issues of these magazines. We will be forced, therefore, on account of this ruling, to cut off subscriptions that are not paid promptly in advance. Further than this it will be necessary to reduce somewhat the number of editorial pages in each issue. While in the past our regular issues have varied between 54 and 56 pages, it will now be necessary to have an average of 50. In order to do this without impairing the value of the paper to our readers, the editors will be called upon to edit more carefully every article that is published, printing only that part which is necessary to give the desired information. If, therefore, in the future our contributors feel that their articles have been severely "blue penciled," they will know the reason. We do not wish in the least to discourage our readers from making contributions. It is by their assistance that we have been able to make this paper a success and it is only by their continued assistance that we can hope to secure the best results.

The Traveling Engineers' Convention

The Railroad Administration decided wisely when it granted the Traveling Engineers' Association permission to hold its annual convention. It was a remarkable success from every standpoint. In attendance it was the largest convention ever held by the association—so great that the usual convention facilities of the hotel at which it was held were inadequate and it was necessary to hold the meetings in one of the neighboring theatres. Every session saw an overflow to the galleries, so interested were the men in the proceedings. Every part of the country was well represented by men on the firing line—whose duties brought them in daily contact with the physical operation of locomotives and trains. The interest in the proceedings and the patriotism displayed were remarkable and a most illuminating testimonial to the spirit of railway men in general towards the war.

Inspiring addresses were made by representative men and the thoroughness of the committee reports, together with the thoughtfulness with which they were discussed, plainly indicated that the members of the association appreciated the seriousness of the situation. Throughout the entire convention a spirit of patriotism, service and action was manifest. The subject of fuel economy—one of the most important questions before railroad men at this time—occupied a very large part of the convention's deliberations. Co-operation in its highest sense, to the end that the power may be well maintained, was a predominating feature. Paper restrictions placed upon us by the War Industries Board have made it impossible for us to elaborate as fully as we would like on the entire proceedings.

The railway supply companies exhibiting at the conven-

tion and particularly those having exhibits of an instructive nature are to be commended. It was important that they be there with their experts to render all the assistance possible in familiarizing the traveling engineers with the devices that are to be applied to the standard locomotives, as many of these devices will be new to some roads.

The businesslike atmosphere of the entire convention, both among the railroad men and the supply men, was particularly noteworthy. Each came with a definite purpose—to learn and to instruct, which resulted in the best convention ever held by the Traveling Engineers' Association.

Last Call to Prepare for Winter

Our armies in France are constantly improving their positions, preparing themselves for their strategical winter quarters. Many of them will sacrifice their lives to strengthen the line that their positions may be properly defended when the snow and ice increase the hazards of war. Are we at home strengthening our lines, planting redoubts here and there to strengthen our positions in the face of the oncoming winter? The demands of transportation are constantly increasing. With every soldier that is carried abroad these demands are greater. Everything must be done to provide facilities for proper equipment maintenance through the winter, and every effort must be made while the weather is good to place the equipment in condition for the winter. Have you got those doors on your roundhouse? Is that additional cinder pit built? Has that turntable been repaired? Have you got that machine tool in your roundhouse shop, the lack of which caused you so much grief last winter? Have you built that open shed over your car repair tracks, and have you the many other things which are necessary for you properly to handle the equipment this winter? And to the shop men: Can't you put through a few more locomotives these next few months? Can't you speed up a little bit more and make a final drive to prepare for the winter season? It is the last opportunity for a spurt before the cold weather comes—let us all make the most of it.

Watch Fuel Consumption of Stoker Locomotives

One of the most valuable features of the stoker fired locomotive lies in the fact that it is not subject to the physical limitations of the fireman, but can be worked to full capacity for long periods. This very fact, however, makes it necessary to watch closely the condition of stoker fired engines to insure that high capacity is not secured by the extravagant use of coal. On hand fired locomotives the fireman has a strong incentive to watch the condition of the power, because if the locomotive is not operating economically he has to shovel more coal. If the stoker fired engine is working inefficiently, the fireman makes up for it by running the stoker faster. This applies whether the waste of fuel is due to the condition of the locomotive or to improper manipulation by the engineer.

The roundhouse forces usually depend on the enginemen to report valves out of square, blows in cylinder and valve rings, leaky steam pipes and other defects affecting the economy of the locomotive which cannot readily be located in a terminal inspection. Where the locomotives are fired by stokers it would probably be best to test for such defects at the roundhouse whenever the monthly inspection is made. Stokers can fire cheap grades of fuel satisfactorily and thus reduce the cost of coal burned in hauling trains. With a coal shortage threatened, and with war industries demanding more coal than can be supplied, we must eliminate the waste of even the poorest grades. To do this will require close checking by the road foremen of engines and careful inspection by the roundhouse forces.

Are You Prepared for Blizzards?

"One of the best roundhouse foremen I ever knew said he considered the only plan on which to run a roundhouse was like a fire station; always be ready for the unexpected and expect it to happen," said a railroad officer discussing the difficulties of the men operating engine terminals. In even the best regulated roundhouses emergencies are certain to arise and the way in which they are met is a fair measure of the efficiency of the roundhouse. To be ready for emergencies requires that all routine work be taken care of according to a well prepared plan. A roundhouse without a definite system of handling the common occurrences is not in condition to handle emergencies. There are any number of the roundhouses where the foreman must be consulted about every move that is made. If anything unusual happens it throws a heavy load on the foremen. To say that they usually handle such situations with a fair measure of success is a tribute to their resourcefulness, but not to their foresight. A man who is constantly working under pressure cannot be expected to respond to emergencies when they arise, as well as one who is fresh mentally and physically. We must first make arrangements to handle what can be anticipated; then we will be ready for the unexpected.

Winter is coming and with it will come cold weather. How severe it will be no one can foretell, but the roundhouses must be made ready for storms and extreme cold. During the blizzards of last winter the roundhouse men saw many ways in which the terminals could be put in better condition to handle power under such circumstances. Doubtless in many cases improvements were asked for which, for one reason or another, have not been installed. In that case, the thing to do now is to put up some makeshift wherever feasible and prepare to handle things in the best way possible under the existing conditions. One matter that should not be overlooked is making working conditions as pleasant as possible for the men. A roundhouse is a disagreeable place to work in at the best. If a man works in a freezing temperature, in wet and filthy pits, he is not apt to have much energy left when some emergency demands extra effort.

There is no more discouraging place than a roundhouse in winter when everything is going wrong. It is not to be wondered at that in some cases last winter the men, overwhelmed by the blizzards, gave up and went home. This winter the railroads have resting on them the responsibility of keeping munitions and supplies moving to our boys in France. We *must* keep the roads running. We must not have a single roundhouse shut down at any time. There are a few weeks left before cold weather will set in and every roundhouse man, during that time, should do all he can to get his terminal in condition to meet the unexpected.

NEW BOOKS

Government Iron and Steel Prices.—6 in. by 8 in., 78 pages, bound in paper. Published by the Penton Publishing Company, Cleveland, Ohio. Price $1.

Owing to the number of extensions and revisions in the government prices for iron and steel since they were first fixed by the government with the aid of the American Iron & Steel Institute, the above manual was prepared to meet a need for complete price lists in convenient form. It covers the regulations to June 22, when President Wilson reaffirmed all iron and steel prices then in effect, with the exception of Lake Superior ore, for the third quarter, ending September 30, 1918. In addition to the tables of base prices which cover 62 pages, the book contains the official announcements, a directory of the committees and members, several curves showing the range of prices of various metals since the beginning of the war, and other information of interest.

ORGANIZE FOR THE LIBERTY LOAN

Elaborate Preparations Being Made to Make the Fourth Campaign a Gigantic Success on the Railways

THE railway men of the United States are out to make a new record for Liberty Bond subscriptions in the coming Fourth Liberty Loan Campaign. They subscribed for the first loan on a creditable scale, they doubled their first loan totals in the second campaign, and then they considerably more than doubled their second loan totals in the third campaign. If history repeats itself, as they say it does, the fourth loan totals are going to make the world sit up and take notice.

No stone is going to be left unturned to secure a big subscription. Under Director General McAdoo's leadership as expressed in Circular No. 56, the regional directors are instructing their federal and general managers to organize the railroads and as in the Third Loan campaign there will be a great number of committees reaching every man in railway service.

CIRCULAR NO. 56

It is the intention of the director general that a copy of Circular No. 56 should be given to every railway man. The circular in question has two pages, the first reading as reproduced in the center of this page and the other giving the details of the loan and the methods of subscribing on the partial payment plan. Employees will be allowed to pay for their bonds in eight monthly payments, but in cases where third loan payments are still being made the eight months period may be dated from the first of the year. The full details are given in the circular as follows:

The Fourth Liberty Loan campaign will begin on September 28 and close October 19, and in order to encourage employees to subscribe thereto federal managers are authorized to take such amount of the bonds as may be necessary to care for such subscriptions, and current federal funds may be used as far as necessary in paying for such bonds. . . .

Officers and employees will be permitted to pay in installments covering a period of not exceeding eight months, provision being made so that such installments may be paid by deduction on the pay roll.

In connection with the Third Liberty Loan it was permitted that payments on new subscriptions might begin at the expiration of the period covering installment payments on subscriptions to the Second Liberty Loan, in order to avoid making payment on both subscriptions at the same time.

For that reason payment to the Third Liberty Loan in many cases will not be completed until June, 1919. Since the last loan, however, employees generally have received substantial increases in wages, and therefore it is unnecessary to avoid the making of payments on two subscriptions at the same time.

Payments on subscriptions to the Fourth Liberty Loan may, however, when the subscriber is also making payments on subscriptions to the Third Liberty Loan, commence with the month of January, 1919, the period of eight months running therefrom. In cases where employees are not making payments on subscriptions to Third Liberty Loan bonds, payments shall begin with the pay roll for the last half of October, 1918.

Employees will be credited with interest on bonds during the period of installment payments, and will be charged interest on deferred payment both at 4¼ per cent. When the last installment payment is made the bond will be delivered to the subscriber. Adjustment of interest will be made in the last month's installment payment. Coupon (covering interest which matures during the period of installment payments) will be detached by the federal treasurer and the interest collected. Subscribers will, however, receive proper proportionate credit on account of such coupons in the adjustment of interest to be made in the last installment payment, as described above.

Should employees leave the service before completion of the payments, the amount paid will be refunded without interest.

Employees may pay for bonds in full at the time of subscription; or, if they subscribe on the installment plan, they may at any time pay up the unpaid installments in full and receive the bonds.

Employees should not hesitate to place their subscription with the federal treasurer of the road on which they are employed for fear that their local district may not receive credit for subscriptions, for arrangements are being made so that the subscriptions of railroad employees will be reported according to their homes, and the local district will in each case receive corresponding credit to apply toward its quota.

Instructions are being issued to regional directors relative to the formation of committees, etc., to organize and promote this work, with which committee when appointed all railroad employees are urged to cooperate.

While bonds are being issued in both coupon and registered form, I advise and urge that employees subscribe for registered bonds, which in case of loss or destruction by fire will be replaced by the United States Treasury.

UNITED STATES RAILROAD ADMINISTRATION
OFFICE OF THE DIRECTOR GENERAL OF RAILROADS

WASHINGTON, SEPTEMBER 18, 1918

CIRCULAR NO. 56

The patriotic support of railway employees to the Third Liberty Loan was more than gratifying. On some railroads practically every employee became a subscriber for one or more of these bonds

Now that the Fourth Liberty Loan is about to begin, I earnestly urge all railroad officials and employees to cooperate in securing a "100 per cent" result on every railroad. I believe that where the officials and employees unite in a patriotic support the response will be even more gratifying than that to the Third Liberty Loan.

I realize that there are many instances where railroad employees are not financially able to assume additional obligations. In such instances there should be no criticism of the failure of an employee to subscribe to the Fourth Liberty Loan. I believe, however, that when the urgency of the need is presented to employees that few will fail in their financial support of the Government.

My attention has been called to the fact that in the past loans many employees have subscribed through their banks and through other agencies than the railroads. No criticism should be made against employees for subscribing to bonds in this way, but it is a matter of pride to the Railroad Administration that the employees on each railroad shall receive the credit for all subscriptions they make.

Government bonds are the safest investment in the world, and in making such an investment railroad employees at the same time have an opportunity to help win the war and give needed support to our noble sons and brothers who are risking and giving their lives upon the battle fields and upon the seas.

I hope that 100 per cent of the railroad employees will subscribe to the bonds of the Fourth Liberty Loan. I can think of nothing more inspiring than the great body of railroad employees effectively banded together to work for the success of the Fourth Liberty Loan, and I urge upon each railroad employee patriotically to do his share. In this way we can shorten the war, save many lives, and bring a glorious victory to America and to democratic principle everywhere.

W G McAdoo
Director General of Railroads.

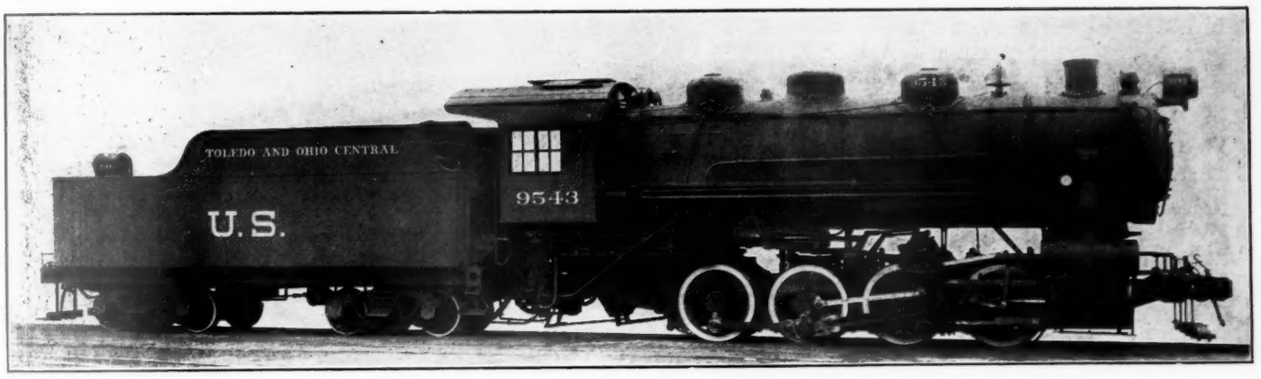
In addition to sending out the circulars the director general has sent a letter to all regional directors instructing them further concerning the extensive and intensive campaign for Loan subscriptions.

Each regional director is doing his part to help the campaign along and long letters of instruction have been sent to every federal and general manager the country over. In addition to suggesting methods of appeal to the men, and directing the prompt printing of circulars, subscription blanks, etc., these letters have advised the federal and general managers concerning the form of organization and procedure which should secure the best results. The eastern regional director in his letter emphasizes that, "No effort should be spared to make this campaign an overwhelming success."

Committees will be established at each shop composed of three or more of the officers in charge and employees. It may be necessary that further subcommittees be appointed to cover outlying shops.

All subscriptions received from railroad employees will be credited to the local committees according to the residences of the subscribers.

Support the Nation to Your Utmost.



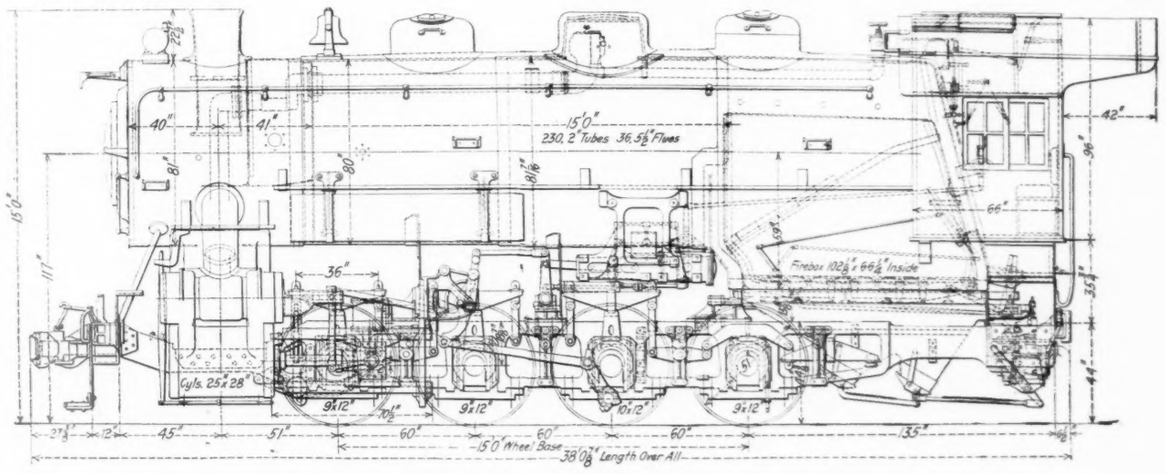
FIRST STANDARD 0-8-0 SWITCHER

Built by the American Locomotive Company; Total Weight 214,000 Lb.; Tractive Effort 55,000 Lb.

THE first of the standard switching locomotives designed by the United States Railroad Administration has been recently completed at the Pittsburgh works of the American Locomotive Company. The locomotive is of the 0-8-0 type, of which 150 have been ordered for this year's production, to be distributed among 17 different railroads. These engines are designed on the basis of 55,000 lb. axle load and have a total weight of 214,000 lb. The driving wheels are 51 in. in diameter and the cylinders 25 in. in diameter by 28 in. stroke. With 175 lb. boiler pressure, the tractive effort is 55,000 lb.

The ratios indicate that for the service intended, the locomotives have ample boiler capacity. The boiler is of the straight top type with a telescopic barrel, the outside diameter of the first ring being 80 in. There are 230 two-inch tubes, laid out with ¾-in. tube sheet spacing and 36 5½-in. flues with ⅞-in. tube sheet bridges. The tubes and flues are 15 ft. long over the sheets. The firebox is designed with a horizontal mudring and does not include a combustion chamber.

The dome is located on the second barrel course. It is 32 in. in diameter and the throttle valve is placed well forward to permit the boiler to be entered without the necessity for removing the throttle. The throttle rigging is of the Chambers inside connected type, the stem extending through a gland on the back head, located 8¾ in. to the right of the vertical center line. The boiler is fitted with a Security brick arch, Type A superheater and Franklin firedoor. The main frames are each cast in one piece and are 5 in. wide throughout, except for the slab section at the rear end. Here the width is reduced to 2½ in., with a depth of 13½ in., this section being increased for 30 in. at the extreme rear end where the deck plate is bolted to the frame, to 3 in. in width by 18 in. in depth. The upper rail is 6¾ in. deep over the pedestals and 5⅜ in. deep at the smallest section between the pedestals. The lower rail is 4⅜ in. in depth over the binders and 3⅞ in. at the minimum section. Under the cylinders the section is increased to 9⅝ in. deep. There is no front deck casting; the bumper casting is attached directly to the front end of the frame rails by means of 1-in. flanged angle plates.



The United States Railroad Administration Standard 0-8-0 Type Locomotive

The details of the running gear follow very closely in design those of the standard Mikado type locomotives, descriptions of which have already been published.* The piston is of the single plate, dished section type, the specifications calling for either cast or rolled steel. The bull ring is of

*See the *Railway Mechanical Engineer* for August, page 436, and September, page 491.

gun iron, riveted in place on the steel piston and fitted with two ¾-in. by ⅞-in. gun iron packing rings. The face of the bull-ring is 4¾ in. wide, increased to a width of 7 in. at the bottom for 45 deg. on either side of the vertical center line. The crosshead is of the same design and interchangeable in detail with that used on the light Mikado type locomotive. Paxton-Mitchell metallic packing is used for both valve stems and piston rods.

Steam is distributed by a 14-in. piston valve, which is interchangeable with that used on both the light and heavy Mikado type locomotives, as are also the valve chamber heads. The engines are fitted with the Baker valve motion and the Ragonnet power reverse gear.

Three standard tenders have been designed to meet the requirements of all the standard types of locomotives. These have 8,000 gal., 10,000 gal. and 12,000 gal. capacity respectively. The 8,000-gal. tender will be used with both the six and eight-wheel switching type locomotives. The tank is of the rectangular type ordinarily used with road engines and is carried on a Commonwealth cast steel frame. It is 27 ft. long by 10 ft. wide by 5 ft. 1 in. high and has a coal capacity of 16 tons. The tank is fitted with the Locomotive Stoker Company's coal pusher. The four-wheel trucks are built up with cast steel side frames and bolsters, and are fitted with 33-in. cast steel wheels mounted on axles having 6-in. by 11-in. journals. The trucks have a wheel base of 5 ft. 10 in. and are spaced 15 ft. 10 in. between centers.

Among the more important specialties are three 3-in. Consolidated safety valves, Ashton steam gages, Murden 2-in. flanged blow-off cocks, Sargent quick acting blower valve with Barco smoke box fittings, Hancock No. 11 non-lifting injectors, Nathan five-feed lubricators, Franklin flexible pipe couplings and the Radial buffer and Unit Safety drawbar between the engine and tender.

The principal data and dimensions are as follows:

General Data.

Gage	4 ft. 8½ in.
Service	Switching
Fuel	Bit. coal
Tractive effort	55,000 lb.
Weight in working order	214,000 lb.
Weight on drivers	214,000 lb.
Weight of engine and tender in working order	381,900 lb.
Wheel base, driving	15 ft.
Wheel base, total	15 ft.
Wheel base, engine and tender	52 ft. 10½ in.

Ratios

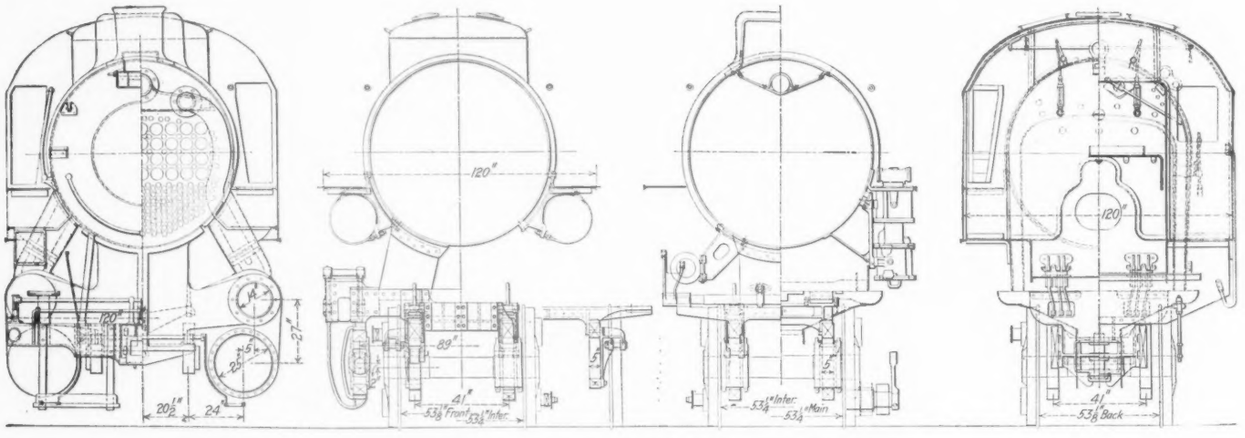
Weight on drivers ÷ tractive effort	3.9
Total weight ÷ tractive effort	3.9
Tractive effort × diam. drivers ÷ equivalent heating surface*	700.0
Equivalent heating surface* ÷ grate area	80.5
Firebox heating surface ÷ equivalent heating surface,* per cent	5.7
Weight on drivers ÷ equivalent heating surface*	57.3
Total weight ÷ equivalent heating surface*	57.3
Volume both cylinders	15.9 cu. ft.
Equivalent heating surface* ÷ vol. cylinders	244.5
Grate area ÷ vol. cylinders	2.9

Cylinders

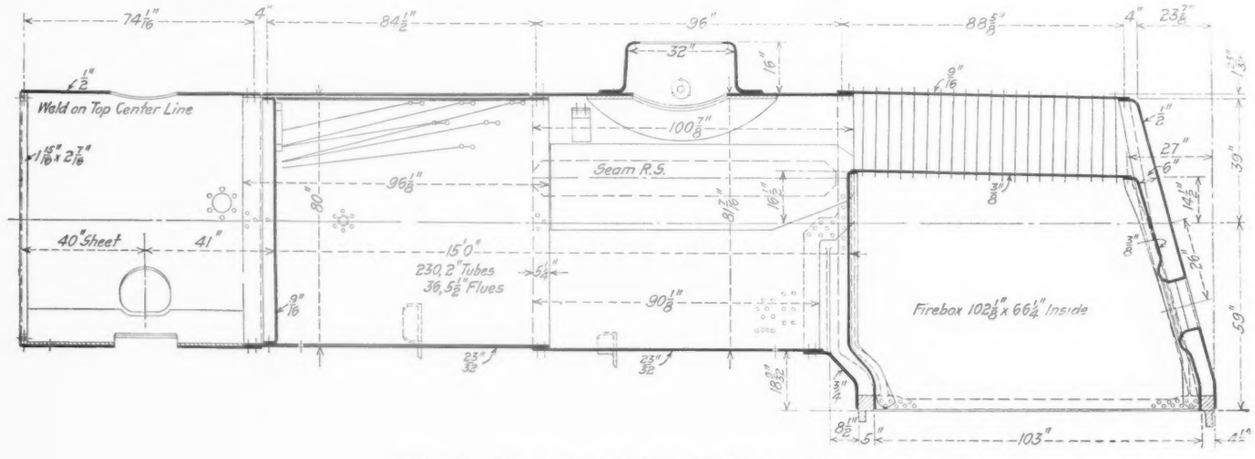
Diameter and stroke	25 in. by 28 in.

Valves

Kind	Piston
Diameter	14 in.
Great travel	6¾ in.
Steam lap	1 in.
Exhaust clearance	0 in.
Lead in full gear	⅛ in.



Cross Sections of the Standard Eight-Wheel Switcher



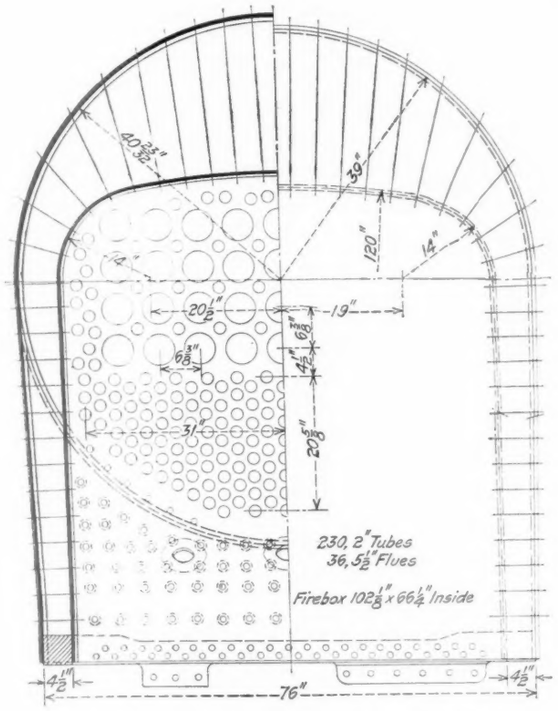
Boiler for Standard Eight-Wheel Switching Locomotive

Wheels

Driving, diameter over tires	51 in.
Driving journals, main, diameter and length	10 in. by 12 in.
Driving journals, others, diameter and length	9 in. by 12 in.

Boiler.

Style	Straight top
Working pressure	175 lb. per sq. in.
Outside diameter of first ring	80 in.
Firebox length and width	102⅛ in. by 66¼ in.
Firebox plates, thickness	Crown, sides and back, ⅜ in.; tube, ½ in.
Firebox, water space	Front, 5 in.; sides and back 4½ in.
Tubes, number and outside diameter	230—2 in.
Flues, number and outside diameter	36—5½ in.
Tubes and flues, length	15 ft.
Heating surface, tubes and flues	2,569 sq. ft.
Heating surface, firebox including arch tubes	212 sq. ft.
Heating surface, total	2,781 sq. ft.



Half Sections Through the Firebox Showing the Tube Sheet Layout

Superheater heating surface	673 sq. ft.
Equivalent heating surface*	3,737 sq. ft.
Grate area	46.6 sq. ft.

Tender

Tank	Water bottom
Frame	Cast steel
Weight loaded	167,900 lb.
Wheels, diameter	33 in.
Journals, diameter and length	6 in. by 11 in.
Water capacity	8,000 gal.
Coal capacity	16 tons

* Equivalent heating surface = total evaporating heating surface + 1.5 times the superheating surface.

LIBERTY MOTOR CYLINDERS.—While formerly all automobile engines and American aviation engines had cast iron cylinders, the J. G. Brill Company of Philadelphia, railway car builders, are making steel cylinders for some of the Liberty motors by a process exactly similar to that used for making shells. A steel billet, almost white-hot, is placed in a mold of the proper size for the outside of the cylinder; then a plunger operated by hydraulic pressure is forced into the steel. The result is a steel cup with thin walls, all ready to be machined into a finished cylinder. After this the sheet steel outer casing that forms the space for the water-jacket is attached by the electric welding process. Steel cylinders for Liberty motors are also being made by the Ford Motor Company, which devised a method of producing steel cylinders out of tubing.—*The World's Work.*

FURTHER INCREASE IN WAGES TO MECHANICAL DEPARTMENT MEN

Director General McAdoo on September 5 issued Supplement 7 to General Order 27, granting further increases in wages to all clerks, station employees, stationary enginemen, boiler-washers, power transfer and turntable operators, and common laborers in shops, roundhouses, stations, storehouses and warehouses. It contains general rules for promotion and adjustments of grievances.

The new rates are effective as of September 1, 1918. Back pay from January 1, 1918, not already paid out, will, of course, be based on the rate established in General Order 27. Under these supplements, the eight-hour day is established throughout for these employees, with overtime up to 10 hours on a pro rata basis with time and one-half thereafter.

SUPPLEMENT 7 TO GENERAL ORDER 27

Effective September 1, 1918, superseding General Order 27, and in lieu thereof, as to the employees herein named, the following rates of pay and rules for overtime and working conditions for all clerical forces in all departments, and for certain employees in stations, storage or terminal warehouses, docks, storehouses, shops and yards, upon railroads under federal control, are hereby ordered:

ARTICLE I.—RATES OF PAY

(a) For all employees who devote a majority of their time to clerical work of any description, including train announcers, gatemen, checkers, baggage and parcel room employees, train and engine crew callers and the operators of all office or station equipment devices, (excepting such as come within the scope of existing agreements or those hereafter negotiated with the railroad telegraphers), establish a basic minimum rate of $62.50 per month; and to this basic minimum rate and all rates of $62.50 and above, in effect as of January 1, 1918, prior to the application of General Order 27, add $25 per month, establishing a minimum rate of $87.50 per month.

(b) This order shall apply to chief clerks, foremen, subforemen and other similar supervisory forces of employees herein provided for.

(c) For office boys, messengers, chore boys and other employees under 18 years of age filling similar positions, and station attendants, establish a basic minimum rate of $20 per month, and to this basic minimum rate and all rates of $20 per month and above, in effect as of January 1, 1918, prior to the application of General Order 27, add $25 per month, establishing a minimum rate of $45 per month.

(d) For all other employees not otherwise classified, such as janitors, elevator and telephone switchboard operators, office, station and warehouse watchmen, establish a basic rate of $45 per month, and to this basic minimum rate and all rates of $45 per month and above, in effect as of January 1, 1918, prior to the application of General Order 27, add $25 per month, establishing a minimum rate of $70 per month.

(e) The same increases provided for in Sections (a), (b), (c) and (d) of this article, shall apply to employees named therein paid on any other basis.

(f) The wages for new positions shall be in conformity with the wage for positions of similar kind or class where created.

ARTICLE II.—STATIONARY ENGINEERS (STEAM), FIREMEN AND POWER HOUSE OILERS

(a) For all stationary engineers (steam), establish a basic minimum rate of $85 per month, and to this basic minimum rate, and all rates of $85 and above, in effect as of January 1, 1918, prior to the application of General Order 27, add $25 per month, establishing a minimum rate of $110 per month.

(b) This order shall apply to chief stationary engineers.

(c) For all stationary firemen and power house oilers, establish a basic minimum rate of $65 per month, and to this basic minimum rate, and all rates of $65 and above, in effect as of January 1, 1918, prior to the application of General Order 27, add $25 per month, establishing a minimum rate of $90 per month.

ARTICLE III.—LOCOMOTIVE BOILER WASHERS.

For all locomotive boiler washers who were on January 1, 1918, prior to the application of General Order 27, receiving less than 26 cents per hour, establish a basic minimum rate of 26 cents per hour, and to this basic minimum rate, and all hourly rates of 26 cents and above, add 12 cents per hour, establishing a minimum rate of 38 cents per hour, provided that the maximum shall not exceed 50 cents per hour.

ARTICLE IV.—POWER TRANSFER AND TURNTABLE OPERATORS

For all operators of power driven transfer and turntables who were on January 1, 1918, prior to the application of General Order 27, receiving less than 21 cents per hour, establish a basic minimum rate of 21 cents per hour, and to this basic minimum rate, and all hourly rates of 21 cents and above, add 12 cents per hour, establishing a minimum rate of 33 cents per hour, provided that the maximum shall not exceed 45 cents per hour.

ARTICLE V.—SHOP, ROUNDHOUSE, STATION, STOREHOUSE AND WAREHOUSE EMPLOYEES (EXCEPT EMPLOYEES PROVIDED FOR IN HARBOR AWARDS).

(a) For all laborers employed in and around shops, roundhouses, stations, storehouses and warehouses (except employees provided for in harbor awards), such as engine watchmen and wipers, fire builders, ashpitmen, boiler washer helpers, flueborers, truckers, stowers, shippers, coal-passers, coal chute men, etc., who were on January 1, 1918, prior to the application of General Order 27, receiving less than 19 cents per hour, establish a basic minimum rate of 19 cents per hour, and to this basic minimum rate, and all hourly rates of 19 cents and above, add 12 cents per hour, establishing a minimum rate of 31 cents per hour, provided that the maximum shall not exceed 43 cents per hour.

(b) For all common labor in the departments herein referred to and not otherwise provided for, who were on January 1, 1918, prior to the application of General Order 27, receiving less than 16 cents per hour, establish a basic minimum rate of 16 cents per hour, and to this basic minimum rate and all hourly rates of 16 cents and above, add 12 cents per hour, establishing a minimum rate of 28 cents per hour, provided that the maximum shall not exceed 40 cents per hour.

ARTICLE VI.—MONTHLY, WEEKLY OR DAILY RATES.

For all monthly, weekly or daily rated employees, in the departments herein referred to, and not otherwise provided for, increase the rates in effect as of January 1, 1918, prior to the application of General Order 27, on the basis of $25 per month.

ARTICLE VII.—MAXIMUM MONTHLY WAGE.

No part of the increases provided for in this order shall apply to establish a salary in excess of $250 per month.

ARTICLE VIII.—PRESERVATION OF RATES.

(a) The minimum rates, and all rates in excess thereof, as herein established, and higher rates which have been authorized since January 1, 1918, except by General Order 27, shall be preserved.

(b) Employees temporarily or permanently assigned to higher rated positions, shall receive the higher rates while occupying such positions; employees temporarily assigned to lower rated positions shall not have their rates reduced.

ARTICLE IX.—EXCEPTION

The provisions of this order will not apply in cases where amounts less than $30 per month are paid to individuals for special service which only takes a portion of their time from outside employment or business.

ARTICLE X.—HOURS OF SERVICE

Eight consecutive hours, exclusive of the meal period, shall constitute a day's work.

ARTICLE XI.—OVERTIME AND CALLS

(a) Where there is no existing agreement or practice more favorable to the employees, overtime shall be computed for the ninth and tenth hour of continuous service, pro rata on the actual minute basis, and thereafter at the rate of time and one-half time. Even hours will be paid for at the end of each pay period; fractions thereof will be carried forward.

(b) When notified or called to work outside of established hours employees will be paid a minimum allowance of three hours.

(c) Employees will not be required to suspend work during regular hours to absorb overtime.

ARTICLE XII.—PROMOTION AND SENIORITY

(a) Promotions shall be based on ability, merit and seniority; ability and merit being sufficient, seniority shall prevail, except, however, that this provision shall not apply to the personal office forces of such officers as superintendent, trainmaster, division engineer, master mechanic, general freight or passenger agent, or their superiors in rank and executive officers. The management shall be the judge, subject to an appeal, as provided in Article XIII.

(b) Seniority will be restricted to each classified department of the general and other offices and of each superintendent's or master mechanic's division.

(c) Seniority rights of employees referred to herein, to: (1) New positions, (2) vacancies: will be governed by paragraphs (a) and (b) of this article.

(d) Employees declining promotion shall not lose their seniority.

(e) Employees accepting promotion will be allowed 30 days in which to qualify, and failing, will be returned to former position without loss of seniority.

(f) New positions or vacancies will be promptly bulletined for a period of five days in the departments where they occur. Employees desiring such positions will file their applications with the designated official within that time, and an appointment will be made within 10 days thereafter. Such position or vacancy may be filled temporarily pending an assignment. The name of the appointee will immediately thereafter be posted where the position or vacancy was bulletined.

(g) In reducing forces, seniority shall govern. When forces are increased employees will be returned to the service and positions formerly occupied, in the order of their seniority. Employees desiring to avail themselves of this rule must file their names and addresses with the proper official. Employees failing to report for duty or give satisfactory reason for not doing so within seven days from date of notification will be considered out of the service.

(h) A seniority roster of all employees in each classified department who have been in the service six months or more, showing name, date of entering the service and the date of each promotion or change, will be posted in a place accessible to those affected.

(i) The roster will be revised and posted in January of each year, and shall be open to correction for a period of 60 days from date of posting, on presentation of proof of error by an employee or his representative. The duly accredited representative of the employee shall be furnished with a copy of roster upon written request.

ARTICLE XIII.—DISCIPLINE AND GRIEVANCES

(a) An employee disciplined, or who considers himself unjustly treated, shall have a fair and impartial hearing, provided written request is presented to his immediate superior within five days of the date of the advice of discipline, and the hearing shall be granted within five days thereafter.

(b) A decision will be rendered within seven days after the completion of hearing. If an appeal is taken it must be filed with the next higher official and a copy furnished the official whose decision is appealed within five days after date of decision. The hearing and decision on the appeal shall be governed by the time limits of the preceding section.

(c) At the hearing or on the appeal the employee may be assisted by a committee of employees or by one or more duly accredited representatives.

(d) The right of appeal by employees or representatives, in regular order of succession and in the manner prescribed up to and inclusive of the highest official designated by the railroad, to whom appeals may be made, is hereby established.

(e) An employee on request will be given a letter stating the cause of discipline. A transcript of evidence taken at the investigation or on the appeal will be furnished on request to the employee or representative.

(f) If the final decision decrees that charges against the employee were not sustained, the record shall be cleared of the charge; if suspended or dismissed, the employee shall be returned to former position and paid for all time lost.

(g) Committees of employees shall be granted leave of absence and free transportation for the adjustment of differences between the railroad and the employees.

ARTICLE XIV.—RULES FOR APPLICATION OF THIS ORDER

(a) It is not the intention of this order to change the number of days per month for monthly paid employees. The increases per month provided for herein shall apply to the same number of days per month which were worked as of January 1, 1918.

(b) The pay of female employees for the same class of work shall be the same as that of men, and their working conditions must be healthful and fitted to their needs. The laws enacted for the government of their employment must be observed.

ARTICLE XV.—INTERPRETATION OF THIS ORDER

The rates of pay and rules herein established shall be incorporated into existing agreements, and into agreements which may be reached in the future on the several railroads, and should differences arise between the management and the employees of any of the railroads as to such incorporation, intent or application of this order prior to the creation of additional railway boards of adjustment, such questions of difference shall be referred to the director of the Division of Labor for decision, when properly presented, subject always to review by the director general.

Agreements or practices, except as changed by this order, remain in effect.

TRAVELING ENGINEERS' CONVENTION

A Meeting Full of Patriotism and Zest. Fuel Conservation and Other Important Problems Discussed

THE twenty-sixth convention of the Traveling Engineers was held at the Olympic Theatre, Chicago, September 10, B. J. Feeny, fuel supervisor, southern region, U. S. R. A., presiding. The meeting was opened with an invocation by Bishop Fallows.

ADDRESS BY PRESIDENT FEENY

The government of the United States has taken control of the railroads and has placed the Hon. W. G. McAdoo in charge of them as director general of the United States Railroad Administration. This association stands absolutely loyal to him first, last and at all times.

We are all in the service of the government and we must render our service to the greatest extent. Each and every one of us must do all in our power to obtain the maximum efficiency from men, material and supplies. It becomes the sacred duty of every true and loyal American to concentrate his thoughts, his energy and his very life, if necessary, to the supreme task of winning this war. If we fail to win this war the liberty so dear to the hearts of the American people will be a thing of the past.

This association is one of the vitally important factors in winning the war, for without good transportation our men, money and munitions would be useless. Man power and motive power will win the war. They are today the two greatest necessities, and any preventable waste in this world's crisis is inexcusable and indefensible. Upon members of this association rests a great responsibility in conserving men and material, and for the part you are playing in this war you are not alone answering to yourself and your government, but you are answering to the boys over there who are winning the war. Conservation is of prime importance—conservation of every kind. Conservation of fuel is of vital importance. With the expansion of our war industries, the increased demand for fuel for our navy, shipping board and railroads, the most drastic fuel economy must be enforced if this country is to escape a most serious fuel shortage next winter.

B. J. Feeny
President, Traveling Engineers' Association

Greater efficiency must be obtained than ever before and this must be done by education and co-operation. It is possible to get better results from nearly all railroads with practically no additional expense, if every one will profit by his experience and put the knowledge so gained into effect. We should analyze what can be done under present conditions on the railroads which we serve and then make such recommendations as will be justified under win-the-war conditions.

Our government wants conservation—willing conservation if possible. It will enforce conservation if necessary, and from now on let every man of this association who loves America and liberty say "I will conserve. I will put my best efforts forth every day in order that my country will win this war."

In reviewing the requirements and duties of traveling engineers on the various roads, I find that there is a lack of uniformity as to just what is required of them. Standardization of the duties of traveling engineers is necessary to render efficient service. Familiarity of its detail is essential on account of the large number of inexperienced men that are being placed on the locomotives due to the great number of experienced men who have responded to the call of our country to take up arms, and I earnestly recommend to you—

First—To apply yourselves entirely to the management and operation of locomotives.

Second—To co-operate with the various operating departments.

Third—By making suggestions for the improving of conditions which come to your attention in the performance of your locomotive duties.

The Railway Supplymen's Association has arranged for our benefit a splendid exhibit of interesting locomotive supplies and their representatives are here to explain the merits of their material and devices. Much credit is due to the supplymen for their educational work, for we have learned from them the most successful way to apply and operate the material and devices which increase the efficiency of the locomotive. All members should spend as much time around, and give as much attention as possible to, the exhibits. It is far more necessary than ever before on account of the distribution of government standard locomotives.

On the twenty-eighth day of this month every man in the United States will be facing a financial obligation. A little forethought now, a little economy, a little inconvenience, will enable you to meet this obligation and it will give you a warm feeling in your heart when you have fulfilled it. The obligation I refer to is the Fourth Liberty Loan.

In entering this war we have taken upon ourselves a great responsibility, and one which will command the labor and service of every citizen. We must contribute the men and material necessary to reach a turning point and to keep that point behind us forever. We are in the war and we must win the war!

I recommend that our secretary be authorized to send a telegram to the President of the United States, Hon. Woodrow Wilson, and to the Hon. W. G. McAdoo, director general,

United States Railroad Administration, informing them we are in convention to help win the war and reaffirm our pledge of full support.

ADDRESS BY FRANK McMANAMY

There has never been a time in the history of American railroads when the motto of the Traveling Engineers' Association, which is, "To improve the locomotive service on American Railroads," meant as much as it does today. And there is no man in railroad service who can do more to improve the locomotive service on American railroads than the traveling engineer, if he is given proper support. The convention of the Traveling Engineers' Association was therefore authorized by the Railroad Administration because of the value men who are on the firing line of railroad operation obtain from a convention of this kind, where they can interchange ideas and discuss problems and difficulties which all of us must meet and overcome if the national railroad system is to be successfully operated.

Under government operation the work and the difficulties of the traveling engineer have been greatly increased. He is apt to be called upon to look after every known type of locomotive and is expected to obtain equally good results out of all of them.

When I issued instructions to increase shop hours to 70 per week, which, roughly speaking, meant an increase of 20 per cent in shop efficiency and shop output, the response of the railroad employees was extremely gratifying and we have yet to find the first instance where after knowing that it was the desire of the government that the shop hours be increased, that the men refused or failed to work the desired number of hours. The same is true of the men in road service, and men in hundreds of instances gave up their rest period to prevent locomotives, which could not be properly housed, from freezing up and thereby being disabled. The increase in hours in railroad shops has enabled us to increase the number of locomotives repaired about 500 each week over the corresponding week last year and to decrease the percentage of locomotives which are out of service for repairs requiring more than 24 hours from over 18 per cent to a fraction above 14 per cent.

Everyone knows the difficulty of building up the condition of motive power during a period of heavy business, and particularly when there is a shortage of skilled labor at the same time; but this has been accomplished by the government during the most trying period in the history of the American railroads.

When the director general assumed control of the railways it became possible for the first time in the history of the country to adopt and enforce standards. The necessity, during the past winter of transferring locomotives from one line to another and the difficulty experienced in making repairs to such locomotives, when away from their home lines, emphasized the importance of standardizing locomotive construction and this was at once started through the medium of a committee composed of well known mechanical department officials from different sections of the country. As a result of the work of this committee 12 standard specifications for locomotives were agreed upon and 1514 United States standard locomotives have already been ordered and the locomotives are now being constructed at the rate of about 50 per week.

That the standardization of locomotives will facilitate not only the repairs to locomotives and the building of new ones has already been demonstrated, because when standard drawings and patterns have been made it eliminates further delay either in the drafting room or in the pattern shop and enables larger quantities of material to be ordered. Mechanics also work to better advantage on locomotives of the same general type and dimensions.

President Wilson, on April 15, 1917, said:

"To the men who run the railways of the country, whether they be managers or operative employees, let me say that the railways are the arteries of the nation's life, and that upon them rests the immense responsibility of seeing to it that these arteries suffer no obstruction of any kind, no inefficiency or slackened power."

The traveling engineer comes more closely in contact with the men who operate the locomotives of the country than any other railroad official and can do more to prevent the "Inefficiency and slackened power," referred to by President Wilson than any other railroad official.

While the duties of the traveling engineer can be subdivided into a multitude of different items they can be broadly covered under two heads. First, to see that the motive power is kept in good condition for service. Second, to see that it is efficiently and economically operated. Do not understand from this that the traveling engineer is supposed to look after the operation of shops and roundhouses because that is a different line of work, but he should see that all defects which develop in service which prevent economical and efficient performance, should be properly reported and he should insist that repairs be made before the locomotive is returned to service; to carry this out successfully his orders to hold a locomotive for repairs should be observed the same as the orders of federal inspectors. Locomotives should not be offered for service unless they are in a condition to make a successful trip and the traveling engineer should, as far as possible, see that they are not permitted to go into service unless in good condition. The traveling engineer should know the condition of every locomotive under his charge and should see to it that they are shopped for repairs before their condition becomes such that they might reasonably be expected to cause failure on the road. Instructing enginemen as to the proper and efficient performance of their work is not the least of his duties, and the man who is most successful in having the locomotives properly maintained will obtain the greatest degree of co-operation from the enginemen under him and without this his road will be exceedingly rough.

The economic use of fuel is one of the things that is usually under the direction of the traveling engineer and to bring this about he must have the co-operation of the shopmen, the engineers and the firemen. Instructing enginemen as to the proper use of the air brake, operation of the locomotive, transportation rules and proper methods of firing are some of the things which he must look after in addition to the general condition of the locomotives while he is on the road. This no doubt sounds like a pretty big contract, and so it is, but it is only an outline of what is being successfully done by the various traveling engineers.

It is particularly important at this time that every railroad man should do all in his power to promote efficiency in locomotive operation. Winter is but a few months away and we should bear in mind the experiences of last winter and make every effort to go into the coming winter with everything in the best shape it is possible to get it.

It requires about four tons of shipping to maintain one American soldier in France. We have already more than a million and a half of our boys "over there" and it is proposed to put as many more millions there as may be necessary to carry the war to a successful conclusion. It is up to the railroads not only to supply cargoes for this four tons of shipping for each soldier, but to transport the material for building the ships. During the coming winter every railroad man must prepare to do a little more and do it a little better than he has ever done before.

Order No. 8, issued by the director general of railroads, February 21, 1918, reads in part:

"The government now being in control of the railroads, the officers and employees of the various companies no longer serve a private interest. All now serve the government and the public interest only. I want the officers and employees to get the spirit of the new era."

No more important principle has been advanced in connection with the government operation of railroads.

The government did not wish to assume, in addition to the other burdens imposed upon it, the task of reorganizing and operating the American railroads. There was no particular desire on the part of the government or any substantial portion of the American people to go into the railroad business at that time. The railroads were placed under federal control because in the crisis brought about by the war they had practically ceased to function under private management.

I shall not attempt to explain the reasons for this condition because they are many, and the important ones are well known. It is sufficient to state that in a national crisis, when unusual and excessive burdens were placed upon the railroads, when it became essential that the railroads should operate at their highest efficiency as a national unit, the many weak points in the plan of operating the railroads under private management, in numerous systems or units had caused such congestions in various centers of industry that the collapse of the entire transportation system became imminent, at a time when such a collapse would be a world wide calamity. No organization with less authority and power than the federal government could control and direct such a huge task as the nationalization of the American railroads.

During the period immediately preceding the taking over of the railroads by the government we have all heard many railroad men express in a somewhat sarcastic spirit the wish that the government would attempt to operate the railroads, just to see what kind of a mess they would make of it. Such expressions were doubtless made without having given careful consideration to the fact that Uncle Sam has a score of 100 on everything that he has ever undertaken. The United States makes no failures. The question is no longer, can the government successfully operate the railroads, because that has already been demonstrated, the only question now is, how big a success is it going to be? That question will be largely determined by the spirit in which the principles laid down by the President and the director general are carried out and no body of men can do more to aid in carrying out those principles than the members of the Traveling Engineers' Association.

Again quoting from Order No. 8 issued by the director general of railroads:

"Supreme devotion to country, an invincible determination to perform the imperative duties of the hour while the life of the nation is imperiled by war, must obliterate old enmities and make friends and comrades of us all. There must be co-operation, not antagonism; confidence, not suspicion; mutual helfulness, not grudging performance; just consideration, not arbitrary disregard of each other's rights and feelings; a fine discipline, based on mutual respect and sympathy; and an earnest desire to serve the great public faithfully and efficiently. This is the spirit and purpose that must pervade every part and branch of the national railroad service."

The importance and the greatness of the service which the American railroad men are called upon to render is, I fear, not fully realized. Everyone knows that we are in this war to win and that we are going to win and the splendid reports of the work of our boys in France leaves no doubt in any one's mind as to what they are doing and what they are going to do: but the thing that railroad men here must realize is that they are an essential part of the American Expeditionary Force. That they are truly a part of the American army. That they have an important link in the chain of communications with the front to maintain and to operate successfully and that a failure of any part of our transportation system is the only thing that can possibly endanger the success of the Allied army. But such a failure will not occur if we who are operating the railroads do our bit as well as the boys who have gone across. Just as sure as Washington crossed the Delaware, Pershing with a million of our boys behind him will cross the Rhine.

Mr. McManamy spoke extemporaneously of the operating features of the government standard locomotives, which he characterized as among the best ever designed. He said there was nothing freakish about them and for that reason it should be easy for the enginemen to become accustomed to them. He anticipated that they would eliminate the troubles encountered in maintaining equipment borrowed from other lines. This foreign power, Mr. McManamy stated, was often held up for periods as long as 30 days, due to delays in securing material with which to make repairs.

THE RAILWAYS IN THE WAR

BY SAMUEL O. DUNN
Editor of the Railway Age

On the first occasion when I addressed you (in 1911) the two subjects pertaining to the railway business which were uppermost in the public mind were those of advances in rates and of operating efficiency. The Interstate Commerce Commission had just recently decided the first important case which the railway companies instituted to secure general advances in rates. You will recall that the commission refused to permit the advances upon the ground that they were unnecessary.

The decision rendered at that time affords a striking contrast to certain steps which recently have been taken, and which have resulted in passenger rates being advanced about 50 per cent and freight rates about 25 per cent. One cannot help wondering what would have been the course of developments in the field of transportation if the Interstate Commerce Commission had seen the light at that time, and granted the advances in rates which subsequent developments have conclusively demonstrated were needed.

Recalling that decision of the Interstate Commerce Commission caused me to recall also the most sensational development which occurred in the hearings in that case. This was the attempt of Mr. Louis D. Brandeis, an attorney for the shippers, to show that the railway managements, by the application of the principles of so-called "scientific management," could reduce their operating expenses one million dollars a day. The railways are now being operated as a single system by the government. Expenses are increasing more rapidly than ever before. This, therefore, would be a most opportune time for those in charge of their management to put the principles of Mr. Brandeis to the crucial test. But they are not doing so—one circumstance among many which indicate that the attacks which were made upon the railway companies for alleged operating inefficiency were as unjust as many attacks which have been made, and are still being made on them upon other grounds.

While, however, the railways did not display much alacrity in applying the principles of Mr. Brandeis, they did show great alacrity and energy in adopting every feasible means for increasing the efficiency of operation. The statistics of the Interstate Commerce Commission reflect in a striking manner the results obtained. In 1911 the number of tons carried one mile per freight locomotive was 6,913,259. In 1915 the figure had been increased to almost 10,000,000, or almost 50 per cent. In 1917, the last year of private operation, the average number of tons of freight carried one mile by each locomotice was 12,636,545, an increase over 1911 of 85 per cent. This enormous increase in the amount of freight traffic handled by each locomotive was due both to increases in the average tons hauled per train, and in the average miles made per locomotive. The average tons per train increased from 383 in 1911 to 649 in 1917, or 59 per cent. The average miles traveled per locomotive per day increased from 55½ in 1911 to 67 miles in 1917, or 20 per cent.

It is impossible accurately to estimate the amount of saving in operating expenses which was caused by this great increase in locomotive efficiency, but it amounted to literally hundreds of millions of dollars annually. There is now a tendency manifested in some quarters to attempt to make it appear that the inefficiency with which the railways were being operated made it necessary for the government to

take them over. I do not criticize the government for taking charge of railroad operation. As an American citizen, I should feel deeply gratified if under government control the operation of the railways should be made far more efficient than it was under private management. The highest efficiency in railroad operation is essential as one important means to winning this terrible war for democracy and humanity. At the same time I challenge as without foundation the allegation that the inefficiency of private management made necessary the adoption of government control. The facts demonstrate beyond question that in the last year of private operation the power of the railways as a whole was more efficient and was operated more efficiently than ever before. The same thing may be shown as to every branch of operation.

How was this great increase in locomotive efficiency attained? It was attributable partly to the work of the managers and officers of the railways, including the members of this association, who have direct charge of the operation of the locomotives. It was partly due to the work of the builders of the locomotives and of the numerous concerns which are engaged in the manufacture of the specialties used on equipment. The best type of locomotive will not produce good results unless it is skillfully operated. On the other hand, the most skillful railway motive power officer cannot get the best results except with locomotives that are well designed, well built, and equipped with the most modern devices. The increase in locomotive efficiency has been due to the fact that, on the one side, there has been constant progress in the design of locomotives and in the invention and introduction of new devices to make them better machines, and that, on the other hand, there has been constant improvement in their operation. The work of those who have operated the locomotives and of those who have engaged in inventing and perfecting new devices for improving them have constantly reacted, one upon the other, and the result has been the wonderful progress to which I have referred.

This co-operation between the railways, on the one side, and the locomotive builders and specialty manufacturers on the other, will be as essential to continued progress in the future as it has been in the past.

We have heard a great deal within recent months about standardization of locomotives. I do not intend to discuss that matter here. There is, however, one thought regarding it which I desire to leave with you. This is that progress in design is far more important than standardization of design. I question very much whether, if an extensive program of locomotive standardization had been adopted by the railways of this country ten years ago it would now be possible to show, as I have shown, that there was such a great improvement between 1911 and 1917 in the design, equipment and operation of locomotives that the amount of freight handled with each locomotive was increased on the average 85 per cent.

Of all the changes which have occurred in the railroad business since it was my privilege to address your association before, the greatest, of course, are those which have been caused by the war in Europe and by the final entrance of our country into it. It is questionable if there is any class of American citizens engaged in industrial pursuits who have felt the effects of this war more than the railway officers.

It caused an enormous increase in railroad business in this country in 1916, the last year before we entered it. It caused a still greater increase in railway business in 1917, the first year that our country was in it. The organizations and facilities of the railways, after a long period of restrictive regulation were inadequate to cope with this enormously augmented business. There is no part of the record which has been made by our country since we entered the war which affords more just ground for pride and gratification than the way in which the officers of the railways have risen to the demands of the occasion. During the first nine months that the United States was in the war the roads, in co-operation with the War Department, raised regiment after regiment of engineers to be sent to France, and they gave 70,000 of their officers and employees to the army, many of these going "over there" as members of these engineer regiments. Under the direction of the Railroads' War Board they handled a traffic which two years before it would have been inconceivable that they could have handled with the facilities at their disposal. Finally, there came the terrible winter of 1917-18. The weather experienced was the most severe ever known. One of the great trunk lines in the most congested eastern territory spent as much for removing ice and snow in that winter as it did in all the previous six winters combined. That simple fact strikingly illustrates the conditions with which the operating departments of the railways had to deal. Operating expenses were increasing so fast that they were rapidly wiping out earnings. The companies were confronted with demands from their employees for enormous increases in wages—demands many of which it was clear ought to be granted both as a matter of expediency and as a matter of justice. You know the sequel. The government decided that it must step in and take control of railroad operation.

This development was regarded with alarm and regret by a very large majority of railway officers. They did not know how revolutionary the change would prove to be. They could not anticipate how it would affect them individually. What has been the attitude of railway officers toward government control? It has been that of American citizens. They have put the welfare of their country above every other consideration. They said, in effect, at the start that whether it was right or wrong, wise or unwise, for the government to take over the railways, now that it had done so they would loyally give it the best service of which they were capable in any place to which it might assign them. That has been their attitude ever since. It will be their attitude until the war is won.

RAILWAY FUEL CONSERVATION

BY EUGENE McAULIFFE
Manager Fuel Conservation Section, Division of Operation, United States Railroad Administration

There is no governmental function of greater importance in existence today than that of the United States Railroad. Men have said that food would win the war; that fuel, that men and munitions, that ships would win the war. They will, after the United States Railroad has gathered the grain, the coal, the iron, the lumber, and all the other raw materials, and transported them to the mill, furnace, and factory, to again move the finished product to ship-side. I am wondering whether or not we have measured up the job that remains for "the second line" to complete! Perhaps we do not all realize that the first two million were largely made up from the ranks of college students, the younger professional men, and those who were not closely tied into the world's affairs. The call for 2,000,000 more men which was just issued will cut deeper into the ranks of industry than did the first call. That means that there can be no slackers in the office, the shop, the cab or caboose; no slackers in the mine or the factory; it means a full day, a full hour, and a full moment for us all. It means work and save, and that is our duty, and to you who lead and plan and direct, it means double duty.

I have consistently said that the men officering and operating the railroads, knew how, could, and would save fuel. It is simply a question of how to do the most with the means at hand. To take a skilled man out of service as an instructor, creates a demand for an unskilled or partially skilled man to take his place; to make extensive changes in locomotives, shops, coaling stations, etc., means heavy drafts on

labor and material. All this should be done, but done in an orderly way. The real issue is that of getting every man to do the things he knows best how to do, with the means at hand. Saving fuel means saving everything else chargeable to locomotive operation; it means the expenditure of skill that decreases boiler and machinery repairs, decreases maintenance costs, decreases overtime losses; the wasteful use of fuel means the opposite.

The trouble with the fuel end of the railroad where it is given any measure of consideration at all, is that it is generally looked upon as a mechanical department function, when in fact it really reaches into and overlaps every department of the railroad. The conservation of railway fuel begins at the mine, thence over the track scales, on to the coaling station, through the breaker bar into the pockets, thence to the tender and the furnace door, not to end at the stack mouth but to begin again at the drawbar and sweeping back it embraces the trainmen, the despatchers, the yardmasters, the signal men, the men in charge of air brake maintenance, the men in charge of lubrication, the maintenance of way men, from the chief engineer down to the trackmen, the superintendent and his assistants. They too save fuel and waste fuel with the rest. The fuel job is an operating department job and just so long as it is looked upon as an annex of the locomotive department, just so long will its economic possibilities be dwarfed and stunted.

The man who is responsible for the operation of the road should seize this greatest of opportunities for increased efficiency by organizing a fuel department, drawing on the mechanical department for the best men it can spare, mechanical department training alone fitting a man for the most important work. This man should be big and broad enough to do justice to the mechanical department which has in times past been combed for results while other departments went free. To save fuel, work must not alone be done with the men in the cab and the shop, but with all the men on the whole line and back to the coal mine. This man I would call a Superintendent of Locomotive Operation and he should have an assistant for each seventy-five locomotives, such an assistant to be a man of the capacity of a first class traveling engineer to help cover the field I have mentioned. In addition a sufficient number of skilled firemen should be detailed as firemen instructors to admit of giving each new fireman a proper measure of training when road service begins. The fireman instructor should also be given charge of the work of training the fire cleaning force at terminals, which duty will bring him in touch with the real pulse of the locomotive end of fuel economy, the dirty fire. The motive power department may need one or more traveling engineers for work other than fuel economy; the superintendent may require one or more assistants to pursue investigations, etc., but these men should be apart from the locomotive operation organization whose function should be, the conservation of fuel in all its collateral relations.

The supervisors attached to the Fuel Conservation Section, the department I speak for, find in many places certain outstanding conditions requiring correction. I will enumerate a few only.

Things are never quite as well as the men who live with them daily think they are; for example: Nozzle and front end standards are not maintained; this is frequently due to front end leaks, stopped up flues and superheater tubes, dislocated brick arches, dirty boilers, etc. Try opening the front end of a dozen locomotives, then look down the stack.

The stationary steam plants of the average railroad are badly designed and indifferently maintained; air leaks in brick settings; cracks in fire walls and behind fire arches with short circuiting of gases; lack of stack dampers; an unwholesome disregard of radiative losses, both on boiler sheets and steam lines; leaking water and steam valves, no attempt made to use exhaust steam for heating feed water or buildings; fuel supply exposed and wasted; no facilities for cleaning tubes, etc. I will not speak of the general disregard of the value of gas analyses and CO_2 determinations in the larger plants.

Open fires in switch and roundhouse yards—the best of lump coal used.

Overloaded tenders with coal littered all over coal chutes, roundhouse and freight yard tracks; look your hump yard over, it will surprise you.

Cars leaving coal chutes with from 500 to 2,000 lb. of coal in pockets.

Tenders that leak coal through the side and gangway and through holes around the grate rigging; shop tenders standing half filled with coal for weeks; road and yard engines that carry coal on sides of tank and over water cistern to mix with cinders and become valueless.

Cabooses stored with lump coal, the stove red hot with the doors open; steam heated coaches cooled by opening windows and ventilators; switch shanties with open doors and red hot stoves; coal piled outside on the ground in a pile so profuse as to shout "welcome."

Badly made up trains, box cars moving in trains with open doors, increasing train haul resistance.

Excessive standby time at initial and destination terminals, resulting frequently from lack of co-ordination between mechanical and transportation men.

Wasteful firing of engines on roundhouse tracks; fine coal losses through grates when firing up engines, and the dumping of half consumed coal put in fireboxes just before engine is placed on cinder pit tracks.

A disposition to let the brick arch saving and the superheater saving carry distorted steam distribution, defective valve and cylinder packing rings, and dirty boiler losses.

Indifference to fuel and other losses chargeable to improper lubrication of moving parts, including the internal lubrication of the locomotive as well as freight train journals.

Train line leaks. Men who should know say freight train line leaks absorb ninety-five per cent of the air made by locomotive compressors and consume six million tons of coal annually; a six-pound per minute leak, under a fifty car freight train, consumes, when supplied by single stage compressors, 800 or 900 lb. of coal in ten hours; a fifteen-pound leak will require the service of two single stage air compressors and consume 2,600 lb. of coal in ten hours. I have reports of seventeen pounds leakage on the engine and tender, and sixteen pounds per minute under a train of 46 freight cars. The remedy lies in the repair shop and yard; with the switchmen who fail to cut hose by hand and in the crash and bang that takes place in switching and hump yards. The single stage compressor should give way to the cross compound using one-third the steam, and producing more air, with decreased radiative losses. Let me impress on you that the single stage air compressor with the air end running at a temperature of 200 to 400 degrees Fahr. is the most extravagant steam user ever constructed as measured by results obtained; this fact alone should be sufficient justification for reducing train line leakage losses.

The average cost of coal on locomotive tenders now exceeds $3.50 per ton; the railroad fuel bill for 1918, including bituminous and anthracite coal and fuel oil, will total $650,000,000. This represents 250 per cent of the fuel bill of 1915, the year preceding our entry into the world war. The issue, however, is not one alone of money; it is a question of volume, of enough coal and oil to go around, to keep the railroads, the steel plants, the munition factories, the ships supplied, to keep our millions of homes warm. England recently took 8,600 fighting men out of the ranks to mine coal, with more to follow; American soldiers will take their place.

The heroic women of France are rationed on fuel, a family

of five or six get a wash basin full of coal daily, with which to cook, to heat, to cleanse. Coal like liberty has been so free with us that we find it hard to attach a sense of value to it; the value is there, however; not alone a money value, but a value that flows from an insufficient supply and we must recognize the fact.

It is not the function of the Fuel Conservation Section to do the work of conserving fuel, that work like everything else connected with the operation of the railroads goes to make up the work of the men who man and officer the several lines. We will point the way and help you all we can.

Progressive managers are in many cases forming fuel saving organizations of the character outlined above; only a few have not as yet moved. On the whole the awakening to this situation is startling. I am arranging to make every paid railroad fuel inspector a representative of the United States Fuel Administration Inspection force, increasing their authority and usefulness. Where information reaches me that a railroad is being discriminated against in its fuel supply an immediate investigation is made and a remedy applied. The United States Fuel Administration is working hard for cleaner coal and the effort is bearing fruit. What we want is interest, human interest, individual endeavor, a certain and defined recognition of the fact that coal and fuel oil today, while more costly than ever before, have a value beyond price.

For the past few days the name of Lens, a coal mining town in northern France, has stood out sharply in the war news headlines. For three years, the contending armies have surged back and forth on the outskirts of this city, the center of the most important coal field in France. French guns stationed behind the refuse piles surrounding these deep coal pits yielded reluctantly to the enemy. The surrounding terrain is a grave yard, twenty-five thousand allied troops falling there in one battle. For what was this toll of human life? For coal. The Allies are in Lens again. When you hear the name of Lens, think of coal.

MR. QUAYLE'S ADDRESS

Robert Quayle, superintendent motive power and car department of the Chicago & North Western. spoke of the importance of the work of the traveling engineer and the necessity of having men who could handle it in a broad, thorough manner. The traveling engineer, if he is the right kind of a man, must be able to get others to respond to his efforts. To do this he should work with the idea of serving rather than dominating.

Touching on the problem of fuel conservation, Mr. Quayle said that the production of coal was not keeping pace with the demand. There is danger of a shortage which will slow up our manufactures. Every man must be thinking and working to conserve the fuel supply. Coal must be utilized to get the maximum result. To do that the locomotives must be kept in the best of condition. The traveling engineers should see that all necessary repairs are made before the locomotive leaves the roundhouse.

HOW CAN THE TRAVELING ENGINEERS BEST AID IN THE MAINTENANCE OF LOCOMOTIVES

BY F. P. ROESCH
Fuel Supervisor, Northwestern Region, U. S. Railroad Administration

There is no question but what the demand for power will be equally as great if not greater this winter than it was last, and to meet this demand it is imperative that all lend their best and united efforts to put and keep the power in the best possible condition.

Those whose duty it is to overhaul and maintain power are up against a hard proposition. Skilled shopmen are scarce and hard to get. The railway shops have been depleted by draft, enlistments and by mechanics entering other fields holding out the promise of a higher remuneration; therefore the time of every shopman is worth much more to the Railroad Administration than is represented in mere dollars and cents. Every hour spent in doing unnecessary work, every hour spent in repairing an avoidable defect or breakdown, is just that much of a setback to another locomotive waiting to be turned out of the shop or roundhouse.

Here is where the traveling engineer can help in maintaining power. The first requirement will be unqualified and undivided loyalty to the United States Railroad Administration. Get the full meaning of this statement. Beyond doubt, during the coming winter it will be necessary to transfer power from one road to another as the demands of the traffic require. If a traveling engineer thinks and acts for his home road only, is it not natural that when he sees a locomotive lettered P. D. Q. Railway or even U. S. A., he will say: "That is not one of our engines, so I won't bother my head with it"? And does it not follow that his attitude will be reflected in the work of the enginemen? It may extend even to the roundhouse men as far as the wipers.

Forget the X. Y. Z. Railroad and remember only the U. S. A., because one engine is just as valuable to the Railroad Administration as another engine, and all should receive exactly the same amount of care and attention on your part and that of the men under your supervision as the engines bought for and owned outright by the company directly employing you.

Remember that in order to correct a defect it must first be known. Terminal inspectors are invaluable and find many defects, but the real place to inspect a locomotive is on the road and in service. Suppose, for instance, a follower bolt was working out of a piston head, could any terminal inspection locate it? Are there not many other defects that only manifest themselves when the engine is running that no terminal inspection, no matter how thorough, can locate?

It is a short job to replace a follower bolt, but it takes time to patch a cylinder. If shopmen don't have to spend so much time repairing avoidable breakdowns they will have more time to make repairs due to normal wear and tear.

It is not clear that you can materially assist in maintaining power by carefully noting each defect in every engine you ride and in reporting it immediately, before it results in a breakdown?

There are at present 50 federal inspectors to cover 250,000 miles of railroad. When we look back and see what these 50 men have accomplished toward improving the general condition of all the locomotives in the United States, we can appreciate what 1,300 traveling engineers working along the same lines can do.

But even that is not all. You can do more yet. By your example multiply yourself fifty-fold.

After you have convinced yourself that you are working for the U. S. A. and not the X. Y. Z. Railroad, line up the men under your supervision in the same way. Show your men that all locomotives are U. S. A. locomotives, and that it is their duty to get the very best there is in them out of them; that when laying on sidings waiting for other trains, they should, if they would deserve the name of enginemen in every sense of the word, get down and inspect their engines, tighten up any loose nut or bolt they may find, put a nail or piece of wire in place of any missing cotter or split key, fill a grease cup or set up a wedge, if necessary, or do anything else that they can do to help matters along, regardless of any contracts or agreements they may have relieving them of this duty. And have them make notes of any defects they cannot repair, and report them on arrival, even though they are not required to make work or inspection reports.

Think how much of the time of shopmen they can save by a little timely attention to such small details, and how at one stroke they can increase the number of federal inspectors from 50 to 65,000. The enginemen are now giving us much in faithful and efficient service, but if the matter is put before them in the right light they will give even more. There are no slackers among them.

You can help by being optimistic. Next winter when things are coming tough, kicking or whining will not help matters. Therefore, radiate cheerfulness, smile and make the others smile too. Encourage the enginemen; when they make a good run or save a breakdown, tell them about it. If they are doing wrong, show them the right way, not in a fault-finding manner, but as Robert Quayle put it, "in a big brotherly way," so that the men will see you are trying to help them to help the cause.

But go farther yet with your encouragement. A kind word to an engine watchman or hostler helper may save a bursted branch pipe next winter. Above all things preach the doctrine of U. S. A., not only among road men, but roundhouse men also. You have no authority over roundhouse or shopmen, but do not hang back on that account. Visit the roundhouse, anyway, and cheer up the roundhouse foreman occasionally. He needs it and deserves it. If he has taken the slam or the blow out of an engine, following one of your reports, tell him about it. If a machinist has filed a brass or a truck man has packed a box and has done a good job, tell him. Let them know their work is noticed and appreciated. There is nothing that sets work back as much as all blame and no praise.

If the traveling engineer will work along these lines, put his whole soul and energy into his work, and encourage all others to do likewise, he can do as much toward aiding the United States Railroad Administration toward maintaining locomotives as a whole army of mechanics. Remember always that the man who does not at this time give all that is in him is as much of a slacker as the man who turns his back on the Hun in the trenches.

DISCUSSION

H. M. Curry (Nor. Pac.) spoke of the need of an esprit de corps among the enginemen in the present emergency, and stated that in his opinion nothing would be of more assistance in keeping locomotives in good condition and saving fuel than thorough wiping at terminals. Keeping the engines would not only facilitate inspection but would also make the working conditions more pleasant for the enginemen and incite them to greater efforts to keep the power in good condition.

J. B. Hurley (Wabash) spoke of the waste of fuel which often results from the improper use of the injector. He stated that in his opinion the injector should always be operated by the engineer. He spoke of the necessity of properly maintaining the wedges and binders. Well maintained wedges save the driving boxes and properly maintained binders will reduce the number of broken frames. The traveling engineers should do all they can towards keeping the locomotives in good condition.

One of the members spoke of the desirability of avoiding the unnecessary shifting of power due to the trouble experienced in operating classes of engines with which the men are not familiar. He cited the instance of a class of locomotives which gave so much trouble due to loose follower bolts that it was found advisable to remove the cylinder heads and inspect the pistons at the end of every round trip.

H. C. Woodbridge, fuel supervisor, Railroad Administration, called attention to the fact that it would barely be possible to get all the locomotives in good condition under the present circumstances. It is therefore essential that the roads face the conditions as they exist and make plans to utilize the motive power to the best advantage.

Several members spoke of the hearty co-operation received from the enginemen. The lodge halls of the brotherhoods had been used by the traveling engineers for meetings with the men. Appeals for economy in the use of fuel had met with a hearty response.

J. C. Petty (N. C. & St. L.) urged that the more experienced engineers should take upon themselves the duties of the traveling engineers and by making close inspection of their engines and complete work reports enable the traveling engineer to devote his time to instructing new men.

Mr. Roesch in closing the discussion said that the traveling engineer belongs in the cab instructing the engine crew. He should see that it does what it can to properly care for the engine. The traveling engineer should work to his utmost covering as many locomotives as he can and to the best of his ability see that they are in proper condition for the engine crew to run. Time and material are of the greatest value to the nation at the present time. He spoke of the possibility of a general pooling of power, particularly if conditions arise similar to those of last winter. The men must be made ready for such an emergency. Pooled power has been operated successfully on some roads and there is no reason why it could not be as successfully operated on all roads. Locomotives transferred from one road to another may give trouble at first but if they are taken in hand promptly these troubles can soon be overcome. They must be overcome and the engines properly maintained for the sake of the nation which is now the paymaster for all railway men. It will cause inconvenience but the war creates inconvenient conditions.

CO-OPERATION OF TRAVELING ENGINEERS AND GENERAL AIR BRAKE INSPECTORS

[The full title of this report is "How Can the Traveling Engineers and General Air Brake Inspectors Best Co-operate to Improve and Maintain the Air Brake Service?"—EDITOR.]

It is hard even for those who have been in constant touch with railroad development to realize just how fast the tonnage handled by the railroads has been increased during the last few years, and what efforts have been necessary on the part of the railroads and manufacturers of railroad equipment to meet the requirements of safety, promptly and economically handling this increased tonnage. The increased weight of locomotives and cars, as well as the increased number of locomotives used to handle a train (as many as five locomotives are used on one train on some of our mountain roads), has resulted in a constant increase in the length of trains and the tonnage handled per train, all of which has exacted more care in handling and greater efficiency in the maintenance of air brakes.

The air brake manufacturers, to meet the more exacting conditions imposed on the air brakes, have made every effort to improve and change the equipment to meet the requirements. Although the improvement in brake equipment for both locomotives and cars has been rapid, it is doubtful if it has kept pace with the requirements, and a higher state of maintenance than was required a few years ago is now necessary if we expect to get the desired results.

As changes in road conditions take place, the traveling engineer, on account of being in close touch with the men handling equipment and with operating instructions regarding increases in tonnage and the length of trains, also the placing of power, is in a position to either notice or have his attention called to irregularities that interfere with good train handling. As a rule men handling equipment give their opinions freely as to the cause and remedy for troubles, to the traveling engineer. Although many of these opinions finally prove to be worthless, they are all worthy of consideration until the real cause of trouble is found, and close co-operation on the part of the traveling engineer and general air brake inspector in the analysis of suggestions offered by men handling equipment and of their own observations regarding the cause of and the best methods of overcoming trouble, will result in intelligent conclusions as to the cause and prompt remedies being applied.

We believe that practically all air brake troubles that cause delay and damage to equipment are avoidable; also, that they are due either to a poor condition of maintenance

or improper handling. Where improper handling is the real cause, a continuation of the trouble is almost inexcusable, as most men handling equipment are glad to handle it properly if the right way is pointed out to them, and as the traveling engineer and general air brake inspector are looked to by the men for proper instructions, it follows that close co-operation regarding best methods of handling is absolutely necessary on the part of the traveling engineer and general air brake inspector. Where such co-operation does not exist it will be generally found that the men have little confidence in instructions given by either, and they will handle the equipment according to their individual ideas, which as a rule vary from the best methods to those that are held responsible for damage.

It is of the greatest importance that the air brake equipment on the locomotive be kept up to a high standard of maintenance, and if roundhouse forces are properly organized the equipment will be thoroughly inspected by competent men, and proper repairs made as soon after engines arrive as possible. However, it is a fact that many of the air brake troubles blamed to train equipment are due to a poor condition of maintenance of locomotive equipment, and it is also a fact that too many locomotives are allowed to make trip after trip with main reservoirs improperly drained, excessive pipe leakage, improper air pump lubrication, excessive pressure variations due to feed valve and governor defects, brake valves and distributing valves defective, etc.

All of these troubles have a tendency to defeat the best methods of handling, and are the direct cause of damage and delay that in many instances are blamed on train equipment. While direct responsibility for such conditions should fall on the roundhouse force, proper co-operation on the part of the traveling engineer and general air brake inspector would result in the men being educated to promptly note and report such conditions, which would result in assistance to the roundhouse force, and also to tracing trouble directly to its real cause, and promptly applying the remedy.

It is the general opinion of men coming in close contact with road delays that can be directly traced to air brake defects, that such delays are avoidable and in most cases can be traced to poor terminal inspection and failure to make proper repairs or to a poor general condition of maintenance. This applies particularly to freight service.

The incoming test of trains as a remedy for yard and road delays caused by air brake defects is one that has been advocated by general air brake inspectors for years, but up to the present time their recommendations have been useless. This fact may be due in part to their failure to make the importance of the incoming test realized by operating officials, but surely the mistake of allowing a car that arrives at a terminal or repair point with a defective brake, to be switched into an outgoing train, is as inexcusable as allowing a defective engine to remain in the roundhouse without inspection and discovering the defect after coupling to a train or after an engine failure occurs on the road.

The traveling engineer, more than any one else, realizes the value of prompt inspection and giving the repair force all possible time to make repairs on a locomotive, and he knows the relation that such inspection bears to engine failures and engine mileage during a given period; therefore we believe that if the traveling engineer and general air brake inspector would co-operate in keeping the importance of the incoming test before the operating offcials it would result in a practical system of incoming inspection being adopted in all yards, that would materially decrease delays and damage to equipment and lading.

Brake pipe leakage is one of the most prolific causes of air brake troubles on the road, and although all of us very often hear the men handling equipment complain of brake pipe leakage, it is seldom that we can find a man who has any idea of how many pounds per minute brake pipe leakage exists on the train he is handling. It is therefore our opinion that men handling trains should be educated to understand the condition of the brake pipe, and when necessary to make a report; a clear statement of the number of pounds per minute leakage should be made, instead of the usual report of "too much brake pipe leakage." Co-operation between the traveling engineer and general air brake inspector would result in a thorough knowledge of the actual brake pipe leakage conditions, and a thorough knowledge of such conditions in most cases would result in improvement.

It is probable that brake cylinder leakage is responsible for brake inefficiency more often than any other part of the equipment, and it is also probable that responsibility for such inefficiency is seldom traced to the cylinder unless leakage becomes excessive to the extent of practically making the brake inoperative. It is therefore apparent that brake cylinder maintenance should receive more attention than it does, and co-operation between the traveling engineer and general air brake inspector along this line should result in a more thorough knowledge of the actual conditions of brake cylinders, and a system of brake cylinder maintenance being adopted that would insure work being properly done at the time of cleaning and the proper kind of material being used.

The use of inferior low-cost material in air brake repairs is responsible for more or less air brake inefficiency, and under the present cost of labor there is no doubt that the use of such material is much more expensive than the use of the best material, even at a higher price. While the traveling engineers and general air brake inspectors do not as a rule have much to say regarding the purchase of material, we believe that their co-operation in keeping the attention of higher officials on the quality of material being used, would in many instances result in the best material being furnished, which in most instances would result in more lasting repairs being made which means a higher efficiency and lower total cost of maintenance.

It has not been the intent in preparing this paper to go into detail regarding the best methods of obtaining the desired results, as local conditions have much to do with the detail of maintenance of equipment, and the rules of most of the large roads already require the following of recommended practice as laid down by the Air Brake and Master Car Builder Associations. More close co-operation between traveling engineers and general air brake inspectors would assist in such rules and recommended practices being more closely followed, which would result in improving and maintaining the air brake service.

The report was signed by E. F. Wentworth, chairman, (New York Air Brake Company); W. V. Turner, (Westinghouse Air Brake Company); A. G. Huston, (Virginian); J. B. Hurley, (Wabash) and L. R. Pyle, (United States Railroad Administration).

DISCUSSION

The keynote of the discussion was that the traveling engineers and the airbrake inspectors must co-operate to the fullest extent. The duties of each of these positions are so extensive that it is impossible for each to excel in the field of the other. Airbrake problems must be referred to the airbrake men and train operation problems to the traveling engineer. A great deal of the trouble in handling trains is due to excessive train pipe leakage. This should not exceed eight pounds per minute and in any case it should not exceed the capacity of the feed valve to charge the line. By keeping train line leakage down the trains can be moved much faster over the division and less fuel will be used. Stuck brakes caused by train pipe leakage has made doubleheading necessary in some cases. The leakage should be

traced back to the repair tracks and no car should be released until the air brakes are tested and repaired regardless of the cause for which the car was to be repaired.

A great deal of time will be saved and the equipment better maintained if a thorough test of the brakes is made when a train reaches a yard. On this incoming test minor repairs can be made by the inspectors and the cars requiring heavier repairs should be set out immediately for the necessary repairs. This will reduce the delay of the outgoing test. Locomotives have been found having a leakage of 16 lb. and this should not be tolerated.

A great deal of trouble is caused by the manipulation of the brakes. Many cases were reported where the brakes were not brought to full release before starting, an effort being made to release them with the engineer's valve in the running position. It is the duty of the traveling engineer to teach the enginemen properly to diagnose the air brake troubles in order that detail and explicit reports of repairs can be made. One of the most common causes of train pipe leakage is pulling hose apart and the ramming of cars together in switching yards. The former destroys the hose and the latter destroys the brake pipes and causes the joints to leak. The difficulty of operating passenger trains having P.M. and L.N. air brake equipment, with the supplementary reservoir of the L.N. equipment left in service, has been obviated on the Baltimore & Ohio by using only one train pipe reduction in making a stop, the first application being split to a 10 lb. reduction and then any amount of reduction is permissible. In giving instructions to the enginemen enough information should be included to show them the reasons for such instructions. Difficulties in obtaining proper and sufficient labor to repair the cars were mentioned but it is expected that the increase in wages will hold the men.

OTHER BUSINESS

At the opening session W. E. Brumble, in behalf of the Railway Equipment Manufacturers' Association, presented the Traveling Engineers' Association with a service flag having 20 stars. The flag bears one gold star for Lieut. J. Boyden Russell, who was killed in an aerial bombing expedition on the Italian front.

D. R. MacBain offered some suggestions for increasing the service secured from motive power. He dwelt particularly on the importance of the traveling engineers devoting all their time to improving the condition of locomotives and instructing enginemen in the proper methods of handling them. At the present time they are often required to devote a large share of their time to the investigation of minor matters of discipline to the exclusion of more important work.

At the closing session A. F. Duffy, assistant manager, Safety Section, United States Railroad Administration, gave a talk on the subject of reducing accidents and personal injuries on American railroads.

The secretary reported that the association now has over 1,300 members, and that over 200 members were admitted during the convention. During the past year the association has invested $2,000 in Liberty bonds and has contributed to the American and the Canadian Red Cross. Cash balance in the treasury was nearly $800.

The following officers were elected for the coming year: President, H. F. Henson, Norfolk & Western; first vice-president, G. A. Kell, Grand Trunk; second vice-president, W. E. Preston, Southern; third vice-president, L. R. Pyle, Railroad Administration; fourth vice-president, E. Hartenstein, Chicago & Alton; fifth vice-president, J. H. DeSalis, New York Central; treasurer, David Meadows, Michigan Central; secretary, W. O. Thompson, New York Central; executive committee—W. H. Corbett, Michigan Central; S. V. Sproul, Philadelphia, Baltimore & Washington; T. F. Howley, Erie, and F. Kerby, Baltimore & Ohio.

Chicago was chosen as the next place of meeting.

LIST OF EXHIBITORS

Air Reduction Sales Company, New York.—Acetylene apparatus, oxygen and acetylene generator. Represented by R. T. Peabody, W. T. McCarthy and R. A. Sossong.

American Arch Company, New York.—Represented by A. W. Clokey, R. J. Himmelright, John P. Neff and J. T. Anthony.

American Flexible Bolt Company, Pittsburgh, Pa.—American staybolts, American hollow staybolt iron, American rivets, American marine staybolts. Represented by R. W. Benson, W. F. Heacock, J. A. Trainor, W. Widmeier, M. M. McCallister and C. A. Seley.

American Steel Foundries, Chicago.—Models of the Simplex coupler, Simplex coupler pocket, Economy draft arm, Eclipse coupler yoke, Andrews side frame and Atlas safety guard and third point support. Represented by W. G. Wallace, H. J. Melchert, P. A. Martin, W. A. Wallace and B. C. Hooper.

Anchor Packing Company, Chicago.—Packings, nut lock for air stuffing boxes. Represented by J. C. Weedon and J. A. McNulty.

Ashton Valve Company, Boston, Mass.—Wheel press recording gage, air and steam gages, safety valves. Represented by J. W. Motherwell, H. O. Fettinger and J. F. Gettrist.

Baldwin Locomotive Works, Philadelphia, Pa.—Photographs of locomotives. Represented by C. H. Peterson and C. H. Gaskill.

Barco Manufacturing Company, Chicago.—Engine tender metallic connections for air, steam and feedwater between engine and tender; Barco metallic steam heat connections for passenger cars, coach yards, stations and roundhouses; Barco air reservoir connections; Barco automatic smokebox blower fitting; Barco loose bolt crosshead and slipper. Represented by F. N. Bard, C. L. Mellor, Charles Thomas and F. H. Stiles.

Bird-Archer Company, New York.—Boiler chemicals. Represented by C. J. McGurn, R. P. Bird, C. A. Bird, J. A. McFarland, T. A. Peacock, C. C. Shaw, H. E. Wheeler and J. M. Dooley.

Buda Company, The, Chicago.—Turbo-generator set, 500 watt capacity; headlight case and reflector. Both meet United States headlight requirements. Represented by M. A. Ross, J. W. Cleary and H. B. Bayley.

Chambers Valve Company, New York.—Chambers throttle valve. Represented by Frank Clark, W. H. Bellmaine and E. Barnett.

Commonwealth Supply Company, Richmond, Va.—Lewis power reverse gear. Represented by S. H. Lewis.

Crane Company, Chicago.—Valves and fittings. Represented by Frank D. Fenn and Fred W. Venton.

Dearborn Chemical Company, Chicago.—Represented by T. H. Price, O. H. Reymeyer, W. S. Reed, T. H. Rose, Paul Bowen, I. H. Bowen and I. L. Beebe.

Detroit Lubricator Company, Detroit, Mich.—Lubricator.

Flannery Bolt Company, Pittsburgh, Pa.—Tate flexible staybolt. Represented by W. M. Wilson, Charles Hyland and George Howard.

Franklin Railway Supply Company, New York.—Franklin No. 8 firedoor, Franklin automatic adjustable wedge, radial buffer, engine and tender trucks. Represented by J. L. Randolph, C. W. F. Coffin, C. J. Burkholder and S. J. Rosenfelt.

Galena Signal Oil Company, Franklin, Pa.—Represented by M. M. Meehan, D. L. Eubank, P. H. Stack, L. Gleason, J. A. Graham, F. J. Walsh, C. McNair, G. E. McVicar, L. H. Palmer, W. O. Taylor and A. J. Poole.

Garlock Packing Company, Palmyra, N. Y.—Packing.

Garratt-Callahan Company, Chicago.—Magic boiler preservative. Represented by E. V. Sackett, W. E. Rollinson, T. C. McCollum and A. H. Hawkinson.

Gillespie & Co., A. W., Chicago, Ill.—Economy firebox door, Hendrickson journal bearing boring machine. Represented by A. W. Gillespie and J. S. Seeley.

Hammett, H. G., Troy, N. Y.—Type D Trojan superheat metallic packing. Represented by E. C. Sawyer.

Henry Manufacturing & Grease Cup Company, Terre Haute, Ind.—Henry locomotive grease cup. Represented by Miss Mildred Netherton and Harlow Varney.

Hulson Grate Company, Keokuk, Iowa.—Hulson locomotive grate. Represented by A. W. Hulson and J. W. Hulson.

Hunt-Spiller Manufacturing Company, Boston, Mass.—Cylinder bushings, cylinder packing, piston heads and bull rings, valve bushings, valve packing, valve Tee rings, crosshead shoes, shoes and wedges, air pump bushings, side rod bushings. Represented by J. G. Platt, V. W. Ellet, E. J. Fuller, J. M. Monroe and C. F. Galloway.

International Correspondence School, Scranton, Pa.

Jerome Edwards Metallic Packing Company, Chicago, Ill.—Metallic packing.

Johns-Manville Company, H. W., New York.—Power plant specialties, insulations, J-M expander rings, J-M brake cylinder packing cups, steam traps and slack take-ups. Represented by J. E. Meek, J. C. Younglove, G. Christenson, J. M. Barrowdale, P. C. Jacobs, C. E. Murphy, H. Flanagan, J. H. Trent, D. L. Jennings and E. H. Willard.

Keystone Equipment Company, Philadelphia, Pa.—Wedge bolts. Represented by B. J. Shafer and E. J. Zust.

Leslie Company, The, Lyndhurst, N. J.—Leslie steam heat regulators, Leslie electric headlight regulator and removable coupling nuts. Represented by S. Inglis and J. J. Cizels.

Locomotive Feed Water Heater Company, New York.—Feed water heaters, boiler feed pump. Represented by E. A. Averill and H. V. Jones.

Locomotive Lubricator Company, Chicago.—Locomotive force feed lubricators. Represented by W. J. Schlacks, O. H. Neal and C. W. Rudolph.

Locomotive Pulverized Fuel Company, New York.—Represented by A. H. C. Dalley.

Locomotive Stoker Company, Pittsburgh, Pa.—Photographs of shop equipment and cab view of the Duplex stoker, and photograph of Virginian Mallet No. 802. Represented by C. W. Allen, E. C. Haskins, J. J. Byrne, W. G. Clarke, O. B. Capps, W. S. Bartholomew, O. W. Detrick, J. J. Hanahan, C. E. Peterson, E. F. Milbank, E. Prouty and F. L. Wassel.

Locomotive Superheater Company, New York.—Represented by George L. Bourne, F. A. Schaff, R. J. Van Meter, John Bell, William Boughton, W. A. Buckbee, George Fogg, A. C. Loudon, B. G. Lynch, S. Macdonald, A. C. McLachlan, J. E. Mourne, H. B. Oatley, R. M. Osterman, R. R. Porterfield, G. E. Ryder, G. E. Spengler, H. F. Spicer, K. E. Stillwell, W. G. Tawse and C. M. Wickham.

Long, Jr., Company, Charles R., Chicago, and Louisville, Ky.—Railway paints. Represented by Charles R. Long, Jr., S. W. Russell, W. H. Heckman and G. S. Turner.

Manning, Maxwell & Moore, Inc.—Exhibiting Ashcroft gages, Consolidated safety valves, Hancock inspirators, boiler checks and other appliances. Represented by C. L. Brown and F. J. Wilson.

Metal Thermit Corporation.

Nathan Manufacturing Company, New York.—Injectors, non-lifting; lubricators; boiler check; combined stop valve; gage cocks; power reverse 3-way valve; coal sprinkler; balance lever starting valve used in connection with injectors, water glass gages and cocks, globe and angle valves. (Government standard as applied to standardized locomotives.)

Represented by W. E. Brumble, J. G. Arn, F. C. Davern, W. R. Walsh, Richard Welsh, H. L. Gettys and Herbert Ewan.

National Malleable Castings Co., Cleveland, O.—The Sharon coupler.

National Railway Devices Co., Chicago.—Shoemaker vertical firedoor. Represented by Jay G. Robinson and Milton M. Auerbach.

Ohio Injector Company, Chicago.—Ohio injector, U. S. Government standard non-lifting injector, Chicago lubricator, Chicago flange oiler, Chicago automatic drifting valve and Chicago water glass protector. Represented by F. W. Edwards, W. S. Furry, Frank W. Furry and A. C. Beckwith.

Okadee Company, Inc., Chicago.—Blow-off valves, hose-strainer, water glass protector. Represented by A. G. Hollingshead, G. S. Turner, Harry Vissering and W. H. Heckman.

O'Malley-Beare Valve Company, Chicago.—Multiplate valves. Represented by Thomas O'Malley, Edward O'Malley, J. C. Brown, J. N. Gallagher, Walter Morris and G. A. MacLain.

Paxton-Mitchell Company, Omaha, Neb.—Paxton-Mitchell metallic packing. Represented by Joseph L. Paxton and J. T. Luscombe.

Perolin Railway Service Company, St. Louis, Mo.—Represented by R. P. Le Vake, Joseph Sinkler, Fred Wilcoxen and W. G. Newell.

Pilliod Company, New York.—Sentinel low water alarm, Baker valve gear. Represented by R. H. Weatherly, Fred E. Pilliod, W. H. Bellmaine, Edward Barnett, J. J. Donovan and K. Eklund.

Pocket List of Railroad Officials, New York.—Represented by C. L. Dinsmore.

Pyle-National Company, Chicago.—K-23, E-2, E and M. turbo-generators; also the standard and two special type incandescent headlight cases with accessories. Represented by J. Will Johnson, William Miller, L. H. Steger and F. Kersten.

Railway Review, Chicago.—Represented by H. A. Smith, C. L. Bates, J. M. Lammadee and J. E. Gorigeon.

Sargent Company, Chicago.—Sargent safety water gages, Soedige quick acting blower valve. Represented by George H. Sargent, P. W. Raymond and George S. Garren.

Simmons-Boardman Publishing Company, New York.—Copies of Railway Age and *Railway Mechanical Engineer*. Represented by R. E. Thayer, A. F. Stuebing, L. B. Sherman and F. H. Thompson.

Schroeder Electric Headlight & Generator Company, Evansville, Ind.—Standard U. S. turbo-generator, U. S. standard headlight case and reflector in operation, mounted interior set on ball bearings, parts and accessories. Represented by W. A. Carson, E. W. Jones, F. W. Edmonds and W. T. Manogue.

United States Metallic Packing Company, Philadelphia, Pa.—Models of piston rod and valve stem packing. Represented by M. B. Prewster, Elliot Curtis, R. R. Wells, Harry Flynn, Harry Hyslop and L. B. Miller.

United States Rubber Company.

Vapor Car Heating Company, Chicago, Ill.—Steam hose coupler, reducing valve, hose clamps, stop valve, end train pipe valves, McLaughlin flexible steam joints. Represented by E. E. Smith.

Vissering & Co., Inc., Harry, Chicago, Ill.—Viloco firedoor, locomotive sanders, piston and valve stem packing, bellringer. Represented by Harry Vissering, G. S. Turner and W. H. Heckman.

Western Railway Equipment Company, St. Louis, Mo.—Lindstrom syphon. Represented by S. H. Campbell and R. L. Langtim.

Westinghouse Air Brake Company, Pittsburgh, Pa.—Represented by C. I. Olmstead, A. K. Hohmyer, Lawrence Wilcox, L. M. Carlton, E. B. Farmer, J. A. O'Malley, V. Villette, F. W. Ainsworth, H. H. Burns and F. M. Nellis.

White American Locomotive Sander Company, Roanoke, Va.—Graham-White Perfect sander. Represented by James Frantz and W. H. White.

Wyoming Shovel Works, The, Wyoming, Pa.—Represented by G. E. Geer.

FUEL ECONOMY AT STATIONARY PLANTS

An enthusiastic meeting of railway men directly responsible for the consumption of fuel in the stationary plants on the railways under the control of the Railroad Administration was held at the Fort Dearborn Hotel, Chicago, September 9, under the direction of Eugene McAuliffe, manager, Fuel Conservation Section. The meeting was well attended and inspiring impromptu talks were given by representatives of the Fuel Administration, the Fuel Conservation Section of the Railroad Administration and railroad men.

Mr. McAuliffe in opening the meeting called attention to the great amount of fuel that will be required for the railways this year. At the best possible estimate this will amount to 166,000,000 tons, of which 16,000,000 tons will be used in other than locomotive fireboxes. This coal will cost on an average $3.50 per ton which is 250 per cent of the average price in 1915. While from a purely financial standpoint all possible saving in fuel should be made, the most important reason is its scarcity. It is estimated that the country will be short 75,000,000 tons of soft coal and the railways, the largest consumers of fuel, must contribute a large amount to make up this shortage. Although much has already been accomplished in using fuel economically on locomotives there is practically a virgin field among the railway stationary plants. While no attempt was made by Mr. McAuliffe to go into detail regarding the manner in which fuel can be saved in these plants he called attention to the great importance of keeping steam pipes and boilers well lagged to prevent undue radiation of the heat. Particular attention was also called to the importance of preventing all kinds of leaks. Piping extending for any great distance should have ample provision for expansion. Exhaust steam should be used for heating wherever possible. The buildings should be kept tight in winter.

Fuel must be conserved. The shortage of fuel in England has required that country to take 8,600 men from the army to mine more coal. Coal should be salvaged the same as scrap.

TALKS BY FUEL ADMINISTRATION REPRESENTATIVES

David Moffet Myers, advisory engineer, United States Fuel Administration, spoke of the work the Fuel Administration is doing; described its organization and offered freely the services of the 600 men in that department to help the railway men save fuel. He said that without question 50,000,000 tons of coal or 10 per cent of the country's consumption, could be saved by more careful operation of steam generating plants without any expenditure for additional equipment. He pointed out the fact that practicing fuel economy not only saved fuel but reduced greatly the demands on the railroads for transportation.

George R. Henderson, administrative engineer for the Fuel Administration in eastern Pennsylvania and who has had considerable experience on railroads, called attention to conditions as he knows exist. He opened his remarks with the slogan: "If we can't can the Kaiser, we can help make the can. And this 'can' is made largely of coal," he said. He described the questionnaire which was sent out by the Fuel Administration to all steam plants for the purpose of determining whether or not they were being operated to the best advantage. Accompanying this questionnaire was a poster which was to be bulletined in every power plant. On this poster was the recommendation that a daily record of the coal and water consumption be kept, in order that the men might have a check on the amount used. It suggested the use of draft gages for the purpose of detecting whether any excess air was admitted to the boiler. It recommended the cleaning of tubes and of treating the feedwater to prevent scale forming on the inside of the tubes. It pointed out that suitable insulation on steam pipes, heaters, drums, etc., at least two inches thick would save 80 per cent of the heat. It recommended the use of exhaust steam for heating feedwater, buildings, and other general work, pointing out that the exhaust steam from the engine contains about 90 per cent of the heat in live steam. The necessity for sufficient supervision was also touched upon.

Joseph Harrington, administrative engineer for Illinois, spoke of the necessity for considering the personal equation of the men who handle the fuel. He cautioned that particular attention should be given the small plant. There are so many of them that even though the waste at any individual plant may be small the accumulative effect will be very large. Any organization developed on the railroads should be large enough to give the small plants proper supervision. He advocated strongly a two-pen recording draft gage for boilers so that a continuous record of the manner in which a fire is handled could be obtained and the work of the fireman thus supervised. Mr. McAuliffe agreed with him thoroughly in this. Such a device Mr. Harrington explained, would also have considerable moral effect on the fireman. He would fire the boiler correctly for he would know that a record was being kept of his performance. He also spoke of the importance of weighing the coal in order that the fireman will get a better idea of what he is actually doing. It will give him an incentive to improve his work and that is an important point that should in no way be overlooked. Congenial surroundings are also necessary. A conveniently arranged plant, well ventilated and kept picked up and clean will give the fireman a certain amount of pride and self-respect which will be reflected in his work.

Osborne Monnett, engineer for the Fuel Administration, spoke briefly, calling attention to some of the important points that should be watched in the design and operation of boiler plants.

FUEL OIL MUST BE CONSERVED

Nelson G. Phelps of the Oil Division of the Fuel Administration spoke on the fuel oil situation. He said that the time had now arrived when very serious consideration must be given this product. Oil is needlessly wasted. The Bureau of Mines, a short time ago, estimated that 40,000,000 barrels, or 1,680,000,000 gallons, of fuel oil were wasted yearly due to improper operating methods. It is very easy to waste the oil when it is being burned and it is here that a vast saving must be made. The country is facing a shortage of 29,000,000 barrels and for the last six months it has been necessary to draw from the storage supply.

Improper combustion of the fuel oil is responsible for the greatest waste. There should be some one made responsible for fuel oil economy and detailed to instruct the furnace operators in the use of the oil torch. Proper burners should be used. By far the majority of homemade burners are wasteful and it would be decidedly better to purchase a burner that has been designed correctly. Too often the fundamentals of burner construction are not understood. Better efficiency will be obtained with oil heated to 110 deg. before it enters the burner. The Fuel Administration is planning to publish some educational matter on economical fuel oil consumption which will be free for those handling fuel oil.

A WORD FROM FUEL SUPERVISORS

Various representatives of the Fuel Conservation Section spoke calling attention to the more important defects found around the railway stationary plants. By far the most common is improperly lagged steam pipes and boilers, excessive leakage from both air and steam lines, and improperly maintained boiler settings. Mr. Roesch presented some interesting figures showing that with coal at $3.50 per ton in the furnace, steam at 150 lb. pressure leaking through a ½-in. hole would waste $3,340 per year; through a 1/32-in. hole $1,330 per year. Air at 100 lb. pressure with coal at $2.00 per ton leaking through a 1/16-in. hole will waste $2.89 per month, and through a 1-in. hole, $741.82 per month. It was stated generally that positive and absolute *neglect* was responsible for the greatest wastes. In one case a road was extremely short of water at a certain point, and at the same time was wasting 26,000 gal. through leaky valves. Piping should be above ground in order that leaks can be located and stopped. A case was reported where a set of 9-in. locomotive air compressors was used for furnishing air at high pressure to the shop for tools, while a large shop compressor was used to supply air at a lower pressure to the yards. The shop compressor was not used to capacity and the two methods of producing the air were used simply to give a high and low pressure line. With a reducing valve the shop compressor could furnish air for both the shop and the yard.

In some territories where coal has been very cheap it has been difficult to make the men appreciate the value of fuel, but with the extreme shortage throughout the country they are beginning to realize the necessity for economy and while there is a lot to be done in educating these men they are giving their support and co-operation. The fuel supervisors are holding staff meetings at the important terminals. Their attention is not restricted entirely to the mechanical department; the transportation department is in a position to save a large amount of fuel, and men from that department are included in the meetings. Particular stress was laid on what coal means to this nation and to all of the Allied nations in winning the war. If for the lack of it this country could not do the full measure of work that will be required of it, the length of the war will be increased, and that means that thousands of our boys will be unnecessarily sacrificed.

OTHER SPEAKERS

There were among other speakers at the meeting, H. T. Bentley, superintendent of motive power, Chicago & North Western, who told how necessary it was to stir up the enthusiasm of the men in the practice of fuel economy.

Mr. Anderson, of the Milwaukee Light & Power Company, Milwaukee, Wis., spoke of the success with which pulverized coal has been used in the power plant of that company under stationary boilers. Boiler and furnace efficiencies of over 86 per cent have been obtained with the pulverized coal, the net efficiency being greater than that obtained with the automatic stokers. The Locomotive Pulverized Fuel Company's apparatus was applied last May, and after changing the design of the furnace to adequately meet the new conditions imposed by this method of combustion no difficulty has been experienced with the proper operation of the plant. Mr. Anderson made it clear that in the design of the furnace lay the secret of success in using powdered coal. He spoke very enthusiastically of the possibilities of this method of firing stationary boilers.

The advantages particularly referred to for this method were the constant degree of efficiency, the fact that constant critical attention was not needed as in the case of stoker or hand firing methods and the ease of control of the fire. The waste of fuel accompanying the banking and cleaning of fires is eliminated. At the plant in question which has peak loads night and morning this feature was of particular importance. It was possible to shut a boiler down at night and by keeping the dampers closed to conserve the heat of the brick work in the furnace, to start the fire in the morning from the heat of the brick, the steam pressure having dropped but little. To operate this system most successfully a sufficiently large installation should be made to warrant a pulverizing plant of sufficient size to bring the cost of preparing the fuel down to a reasonable figure.

Mr. Maddox, of the Missouri, Kansas & Texas, told of the experience that road had had with this method of burning fuel at its Parsons, Kans., plant. A sufficiently large furnace volume and the proper baffling of the boilers is very necessary. He believed that this method of burning fuel had come to stay, particularly in stationary plants. Lignite has been used with especially good success although it was fed to the boiler with seven per cent moisture.

C. A. Brandt of the Locomotive Superheater Company called attention to the fuel waste, caused by carelessness and ignorance, such as neglect of washing and scaling boilers, soot blowing, attention to proper damper regulations, condition of fuel bed, air leaks in boiler setting, steam leaks in pipes, etc. This waste is, undoubtedly, very great, particularly among the small and isolated steam plants of the railroads. It should be drilled into the minds of every man from top to bottom that steam and fuel wastes must be eliminated, no matter how small. We must not stop at this, however, for the waste caused by faulty operation is comparatively small as compared with the inefficiencies caused by incorrect designs of power plants and faulty or obsolete construction. Careless operation is bad whether it occurs in a poorly or an efficiently designed plant, but it is just as much a crime to operate a poorly designed plant, when its economy can be greatly improved by the installation of apparatus and devices that we know will produce a definite and positive fuel saving. The efficiency of a steam power plant is fundamentally that of design, and I believe it is conservative to state that for any plant, the economic results are probably 85 per cent due to design and construction, and 15 per cent due to operation under normal conditions.

While material is scarce, man power is infinitely more

scarce, and we must remember that the installation of modern appliances in power plants, such as stokers, ash handling devices, feedwater heaters and superheaters will not only save coal, but they will also save labor.

In regard to the use of superheated steam there is not a man here who is not familiar with the wonderful performance which the locomotive superheater has produced towards increased fuel and water economy and increase in power of our steam locomotives. The locomotive superheater has made possible great savings, increased tonnage and fuel economy, yet, with all this knowledge, and with the knowledge that the superheater will produce equal economies in stationary plants, very few railroad shops or engine house power plants are equipped with superheaters today. I believe I am safe in saying that there are not more than a score of engine house power plants equipped with superheaters.

A correctly designed superheater will not only improve the over-all efficiency of the boiler plant where steam is produced, but what is infinitely more important, it will save steam in its utilization. Condensation in steam lines could be practically eliminated, due to the reserve heat stored in the steam, as well as due to the lower conductivity of superheated steam. In roundhouses where locomotives are fired up from the house blower, there will also be a considerable saving due to the fact that the specific volume of superheated steam is greater than that of saturated steam.

RAILROAD ADMINISTRATION ACTIVITIES

News of the Month from Washington and Various Regions Pertaining to the Mechanical Department

W. S. CARTER, director of the Division of Labor, has issued a circular regarding methods of adjusting differences regarding labor, in part as follows:

In the adjustment of differences of opinion, not involving rates or amount of wages, or hours, that arise in the relations between the officials and employees, which differences are to be expected, sincere effort should be made to reach a common understanding without the necessity of reference to the director general, or to the Division of Labor. Where such controversies are not so adjusted, or where questions involving rates or amount of wages or hours are raised, the following methods will be adopted:

(*a*) Requests by employees for increases in wages, in addition to increases provided for in wage orders, will be filed *only* with the Board of Railroad Wages and Working Conditions, to which board has been assigned the duty of hearing and investigating such matters, as provided in Article VI of General Order No. 27.

(*b*) The method of securing interpretation of wage orders is prescribed by the director general in Supplement No. 6 to General Order No. 27, and the prescribed method should be followed in cases involving interpretations of wage orders.

(*c*) When employees are represented by railway boards of adjustment, the procedure as to all controversies within the scope of their duties will be as directed in general orders creating such boards. The fact that certain employees are not represented by railway boards of adjustment will in no manner deprive them of any of the benefits accruing from such boards. An assistant to the director of the Division of Labor has been appointed, and a staff of representatives has been organized, for the especial purpose of rendering the same service to such employees as though represented by a railway board of adjustment. Boards of adjustment have been created by understanding with the larger organizations of employees, for the convenience of handling such matters and to relieve the director of the Division of Labor of adjusting same. It is not practicable to create railway boards of adjustment, except for the larger organizations of employees.

(*d*) Requests for adjustments in wages by employees *not* represented by railway boards of adjustment, which requests are based upon existing practices or adjustments reached through former arbitrations and settlements, will be presented to the proper officials of the railroads, and negotiations will be conducted in the usual manner up to the chief operating officer, or officer designated by him. Should no agreement be reached, and it appear to be necessary to take the matter further, a joint statement of facts (in duplicate) will be prepared by the representatives of the employees concerned and the proper officials of the railroad, and submitted to the director of the Division of Labor of the United States Railroad Administration. Attached to such joint statement of facts will be such brief arguments by both parties to the controversy as is believed desirable by those concerned. When an adjustment is not then reached through correspondence, a representative will be assigned to investigate, and if by his assistance no agreement is then reached, the matter in controversy will be referred again to the director of the Division of Labor.

(*e*) Personal grievances or controversies arising under interpretation of wage agreements, and all other disputes arising between officials of a railroad and its employees *not* represented by railway boards of adjustment, will be handled in the usual manner by the individual, his representative, or by committees of employees, up to and including the chief operating officer of the railroad, or officer designated by him, when, if an agreement is not reached, the chairman of the committee of employees and the officer of the railroad will refer the matter to the director of the Division of Labor, in the same manner as provided in Paragraph *d* of this circular.

(*f*) When an employee, or class of employees, is not represented by committees, and negotiations cannot be conducted in the usual manner, matters of complaint will be taken up with the proper officials of the railroad. When such employee or employees desire to appeal to the director general, a complete statement of the cause of complaint will be filed by such employee or employees with the director of the Division of Labor. When an adjustment is not reached through correspondence, a representative will be assigned to investigate, and if by his assistance no agreement is then reached, the matter in controversy will be referred again to the director of the Division of Labor.

(*g*) General Order No. 8 suspended negotiations for revision of schedules or general changes in conditions affecting wages and hours pending decision of the matter by the director general, which was accomplished by General Order No. 27. No order has since been issued either prohibiting or directing that negotiations for revisions of working conditions be undertaken. This matter is left to follow the usual course, except that all requests for increases in wages, reduction of hours, or special rates for overtime will be taken up directly with the Board of Railroad Wages and Working Conditions. Where working conditions are not agreed upon by committees of employees and the officials of the railroads, a joint statement of the points at issue will be prepared and filed with the director of the Division of Labor, attaching thereto such brief arguments as may be desired. When an adjustment is not then reached through correspondence a representative will be assigned to investigate, and if by his assistance no agreement is then reached, the matter in controversy will be referred again to the director of the Division of Labor.

Nothing herein contained has reference to employees of railroads not under federal control.

RULES FOR SUBMISSION OF NEW DEVICES

The Division of Operation has issued a circular prescribing the following rules to be observed in submitting new devices or inventions to the Railroad Administration for investigation:

Any person desiring to submit any apparatus or device to the United States Railroad Administration at Washington, for the purpose of having it passed upon and investigated, should forward complete specifications and detail drawings, showing fully and clearly the construction, application, and method of operation of said apparatus or device. The drawings should be made of convenient size for handling and filing, and drawings not larger than 8 in. by 10½ in. are preferred. Large drawings or prints must be multiples of this size.

The specifications and plans should be accompanied by a statement showing the following:

1. Name of appliance or device.
2. Name and address of proprietor.
3. Number and date of United States patent or patents.
4. Purpose of the appliance or device.
5. Brief statement of how the purpose is carried out.
6. General description.
7. Statement of relation to other appliances or devices.
8. Name of railroad or railroads on which used or tried and length of time in use.
9. Name of town, district, or railroad division where used or tried.
10. Name of railroad officers of whom inquiry may be made.

All plans, specifications, drawings, and other descriptions which are furnished for examination become a part of the

United States Railroad Administration's records and may be retained in its files.

When examination has been completed the papers furnished for such examination will not be returned; for that reason original patents, tracings, or other papers of that nature, which may be of particular value to inventors or proprietors, should not be furnished; instead, copies of patents, blueprints, or other descriptive papers of which duplicates can be obtained by the proprietor should be sent. The United States Railroad Administration can furnish no protection of the inventor's or proprietor's rights in any device submitted; therefore, plans should not be submitted until the rights of the inventor or proprietor are fully protected by patent or otherwise.

It is not necessary to submit models of devices. If for any reason it is desired to do so, however, models may be furnished, provided the proprietor pays all transportation charges. After examination models will be returned if the proprietor so requests, but this will also be done at the proprietor's risk and expense; otherwise models will be destroyed. In every case, however, whether or not models are supplied, complete detailed plans and specifications must be furnished; no report will be based on examination of a model alone.

When complete plans of any appliance or device have been furnished they will be placed under examination; after this examination has been completed the person submitting the device will be informed of the results thereof and the conclusions reached.

Arrangements for tests will not be made until an examination of plans discloses the necessity or desirability of conducting a test under service conditions. In case a test is to be made the apparatus must be furnished, installed, and operated without expense to the government.

Correspondence regarding matters of this nature should be addressed to United States Railroad Administration, Frank McManamy, assistant director, division of operation, Washington, D. C.

Nothing in the foregoing is intended to prohibit any railroad from testing and developing devices invented by its employees, or testing other devices which, in the opinion of the officers of the railroad, have sufficient merit to warrant it.

DEFERRED CLASSIFICATION FOR RAILROAD EMPLOYEES

Instructions that the federal managers give their active personal attention to make sure that deferred classification in the new selective service draft is properly claimed for railroad employees that are necessary and also that no such claim is made where it can reasonably be avoided were telegraphed to the regional directors on September 10 by Walker D. Hines, assistant director general. The following list of employees covers those affected by the order:

General officers, master mechanics, roundhouse and shop foremen, machinists, blacksmiths, boilermakers, tin and coppersmiths, pipefitters, electricians, freight car and passenger car repairmen and inspectors, respective helpers and apprentices of all the foregoing, chemists, locomotive inspectors, gang leaders, superintendents and assistant superintendents, trainmasters and assistant trainmasters, train despatchers and directors, yardmasters and assistants, road foremen of engines and assistants, traveling engineers, firemen instructors, locomotive engineers and motormen, locomotive firemen and helpers, conductors, brakemen and flagmen, train baggagemen and express messengers, yard foremen and helpers, hostlers, enginehousemen, telegraphers and telephoners, block operators, telegraph clerks, engineers of maintenance of way, division engineers, roadmasters, field engineers, supervisors, construction foremen, foremen on track work (generally known as section foremen), bridge, building and water service foremen, bridge building, ship and wharf carpenters, signal maintainers, and telegraph and telephone maintainers.

SPEED UP LOCOMOTIVE REPAIRS

Director General McAdoo has instructed the regional directors to get the following message to every machine shop and roundhouse in their territories:

"General Pershing needs more locomotives in France to keep the big American smash going until the kaiser is pushed across the Rhine. The only way we can give General Pershing the locomotives he needs is for the railroads of the United States to take as few new locomotives as possible and thus permit the locomotive builders to send their product to France.

"We can not do without new locomotives unless we keep our locomotives in repair and moving all the time. I make a special appeal to every railroad mechanic and workman to do his level best to turn the locomotives out of the shops quickly and to keep their wheels turning on every railroad of the United States. Here is a direct way in which every man of you can help Pershing and his heroic soldiers and make certain the early defeat of the kaiser."

MECHANICAL STANDARDS ADOPTED

The Committee on Standards for Cars and Locomotives at its meeting last week adopted most of the specifications and general designs which had previously been approved for the proposed standard 70-foot baggage cars and for the proposed 60-foot cars, although the matter of truck design was not definitely decided. Specifications for the 70-foot car are now in the hands of the purchasing committee which is expected to ask for bids shortly. It is expected that orders for about 1,500 cars will be placed. Revised specifications for the lighting equipment, to which there had been some objection on the part of the lighting specialty companies, were adopted on the recommendation of a sub-committee after consultation with six prominent electric lighting engineers. The committee also has under consideration general instructions governing betterments to freight cars.

The committee gave consideration to the use of substitutes for steel for headlining of baggage cars, eliminated fish racks from the 60-foot cars, appointed a committee to make a special study of the use of folding devices and began work on proposed standard rules for the inspection of spark arrester devices in locomotive front ends and for the inspection of ash pans to insure greater fire protection. The committee also recommended the M. M. standards for tinware.

FUEL CONSERVATION AT STATIONARY PLANTS

On September 25, fuel conservation circular No. 14 was issued by the Fuel Conservation Section, covering the uses of fuel at railway stationary plants. About 17,000,000 tons of coal will be consumed in these plants on the roads in the United States and its cost, delivered to the furnace door, will be approximately $60,000,000. The attempt to conserve the fuel used in these miscellaneous power and heating plants is apt to be relatively more fruitful than the efforts directed toward locomotive fuel consumption, because the general efficiency of small isolated plants is usually much lower than that of the locomotives and they are ordinarily subjected to less thorough supervision. The circular mentions many methods by which savings can be most readily affected in respect to the design and equipment of the plants and their maintenance, and to the methods of operation.

GARNISHMENT OF WAGES PROHIBITED

General Order No. 43 was issued September 5, prohibiting the garnishment or attachment of the wages of employees under the jurisdiction of the Railroad Administration.

DELIVERIES OF STANDARD LOCOMOTIVES

Of a total of 382 locomotives delivered to the railroads from August 1 to September 21, inclusive, 127 were of the U. S. R. A. designs being distributed as follows:

Baltimore & Ohio	37	Light	Mikados
Central of New Jersey	10	Heavy	Mikados
Chesapeake & Ohio	10	Heavy	Mikados
Chicago & Eastern Illinois	15	Light	Mikados
Chicago, Milwaukee & St. Paul	25	Heavy	Mikados
Lake Erie & Western	7	Light	Mikados
Lehigh & Hudson River	4	Light	Mikados
Pittsburgh & West Virginia	3	Light	Mikados
Union Pacific	6	Light	Mikados
Wheeling & Lake Erie	10	Heavy	Mikados

ORDERS OF REGIONAL DIRECTORS

Obsolete Freight Car Equipment.—The Northwestern regional purchasing committee asks railroads under its jurisdiction to report any freight car equipment which they contemplate retiring so that the War Board of Electric Railways may determine whether it can be used on electric lines.

Dismantling of Freight Cars.—The Southwestern regional director announces that when the cost of repairs to freight equipment exceeds the amount allotted to be expended for that purpose, the federal manager or general manager may authorize in writing that the cars be dismantled. Before such cars, or cars which are not worthy of repairs, are scrapped the regional director advises that they should be set apart for inspection by the corporation officers who will determine their final disposition.

Conservation of Fuel.—The Southwestern regional director quotes a letter from Eugene McAuliffe, manager of the Fuel Conservation Section of the Railroad Administration, recommending that cinder pit forces, car riders in switch yards and other employees be prohibited from making open fires from lump coal taken from cars and engine tenders. He suggests that when a fire is actually necessary a small shelter house with a stove be installed, thereby reducing the consumption of coal to a fraction of that used in the open fires.

The Hazard of Smoking.—Emphasis is placed on the necessity of prohibiting smoking on railroad property where inflammables are handled. Federal and general managers are asked to issue instructions prohibiting smoking in shops, coaling stations, piers, warehouses, storehouses, freight houses and offices, including record rooms, and around freight platforms and all places where inflammables are handled or stored. Watchmen, guards, officers and other employees in charge of property must see to it that the rule is enforced.

Salary Increases to Subordinate Officials.—In circular 28, dated August 31, the Northwestern regional director announces salary increases to subordinate officials, effective August 1.

Road foremen of engines, traveling engineers and traveling firemen will receive an increase of 25 per cent with a maximum of $250 per month.

Railroads are asked to submit recommendations for increases in the rates of pay of superintendents, master mechanics, etc., and these recommendations will be acted upon promptly upon receipt.

Rates of Pay to Piece Workers.—The Northwestern regional director outlines the practice which will be followed in applying the provisions of General Order 27 and its Supplement 4 to piece workers. This class of labor will receive for each hour worked the same increases per hour as have been awarded to the hourly worker engaged in similar employment in the same shop. Piece workers, like other workmen, will be subject to the minimum allowances, specified in Supplement 4, and the provisions for the payment of time and one-half time for overtime, including Sundays and the following holidays: New Year's Day, Washington's Birthday, Decoration Day, Fourth of July, Labor Day, Thanksgiving Day and Christmas. Railroads having the piece work plan in effect for car or locomotive repairs are requested to submit to the office of the regional director their recommendations as to any further increase in piece work rates which should, in their opinion, be made.

Maintenance of Engine Terminals.—The Eastern regional director orders that to insure proper condition of engine terminals for the winter, repairs be made to roundhouse roofs, windows, doors, heating pipes, lighting systems, etc., November 1. Shelter should be provided for those employees whose occupations expose them to the weather, such as ashpit, turntable and coaling forces, in order to protect the men, and by making comfortable provision help insure retention of sufficient force. Machinery of coaling plants, turntables, etc., should be inspected and repaired and spare parts provided to insure uninterrupted service.

Headlight Requirements on Switching Locomotives.—The Eastern regional director states that it has been determined that when necessary to make changes in headlights on switching locomotives to meet the requirements of the law, or on account of renewals, they will be equipped with headlights of the incandescent type with a turbo-generator and a bulb of suitable wattage.

Purchase of Rolling Equipment.—The Northwestern regional purchasing committee has furnished instructions to purchasing agents on the purchase of rolling equipment, such as locomotives, cars, coaches, etc. When an aggregate purchase for equipment, the capital expenditure for which has been duly approved, is estimated to cost $100,000 or more, an order in triplicate should be sent to the regional purchasing committee with copies of plans and specifications, so that the matter may be submitted to the central advisory purchasing committee for purchase.

Such equipment amounting in the aggregate to less than $100,000 should be purchased by the individual road, subject to the approval of the regional purchasing committee. Proposals covering such equipment should be tabulated and sent to the regional purchasing committee for approval with complete specifications, blue prints, and other details, accompanied by recommendations as to acceptance and reasons therefore. Equipment purchased by individual roads should as far as practicable comply with the equipment standards of the Railroad Administration.

Surplus Bar Iron on the Great Northern.—The Northwestern regional purchasing committee states that the Great Northern has a surplus of bar iron which is available for immediate shipment. Roads in the vicinity of Duluth, Minneapolis and St. Paul requiring iron are asked to draw on this stock before placing orders elsewhere.

Sill Steps for Disposal by the Soo.—The Northwestern regional purchasing committee announces that the Minneapolis, St. Paul & Sault Ste. Marie has 4,800 left-hand single freight car sill steps and 1,800 right-hand double freight car sill steps for safety appliances on box cars available for disposal to other roads. E. T. Stone, purchasing agent of the Soo line at Minneapolis, will supply further information concerning this material.

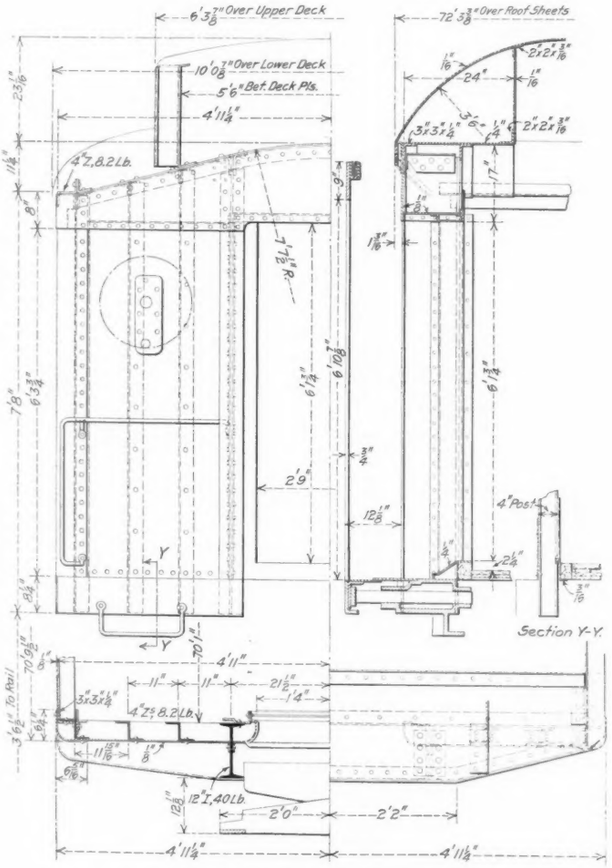
Surplus Material for Disposal by S. P. & S.—The Northwestern regional purchasing committee announces that the Spokane, Portland & Seattle has for disposal at its Portland shops material including angle bars, various sizes of new galvanized corrugated culvert pipe, four-point Pierce transposition *J.* brackets, new caboose cupola lamps, several thousand feet of new circular loom, several thousand feet of cable and a number of miscellaneous items.

Conservation of Scrap Car Wheels.—The following suggestions have been offered to the regional director by H. B. Spencer, chairman, Central Advisory Purchasing Committee: "The need for both new and scrap cast iron wheels is so great that I recommend instructions be issued to all railroads in your region that immediate and effective action be taken to utilize every second-hand and scrap car wheel available. We will require 687,600 chilled cast iron wheels for 87,000 cars and locomotive tenders for the U. S. Railroad Administration, in addition to what is required for the overseas' service. In order to produce these wheels, we must furnish at least 55 per cent old car wheels. With charcoal pig iron available it would have only been necessary to furnish 25 per cent old wheels in the mixture, but charcoal pig iron is unobtainable and we must make up the deficiency with old car wheels. Every railroad acquires and has on hand large quantities of trucks, wheels and axles, which are not serviceable and should be dismantled. In nearly every case a usable wheel or axle will be procured and in all cases scrap wheels will be obtained. A vigorous campaign requiring every railroad to dismantle all unserviceable trucks and press off every wheel from the axles is the only thing which will relieve the present situation."

U. S. R. A. Standard Baggage Cars

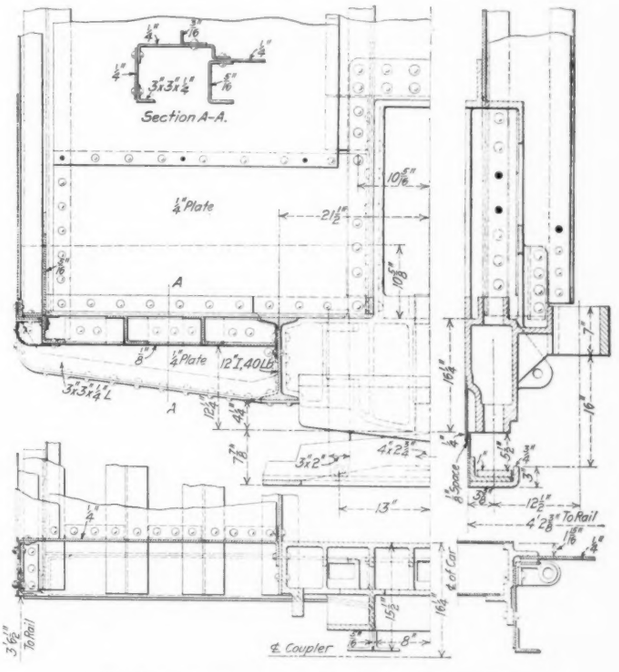
The First Cars to Be Designed by the Government for Passenger Service — All Steel Construction

THE United States Railroad Administration for some time has been working on the designs of two standard types of baggage cars, to be 60 ft. and 70 ft. long, respectively. These cars are of steel construction throughout, with the exception of the floor, and are generally similar in design. The side elevation and floor plan illustrated are for the 60-ft. car, while the details shown are those incorporated in the design of the 70-ft. car. The designs meet the Railway Mail Service requirements as to strength and in some respects are stronger than is called for by the Post Office specifications.



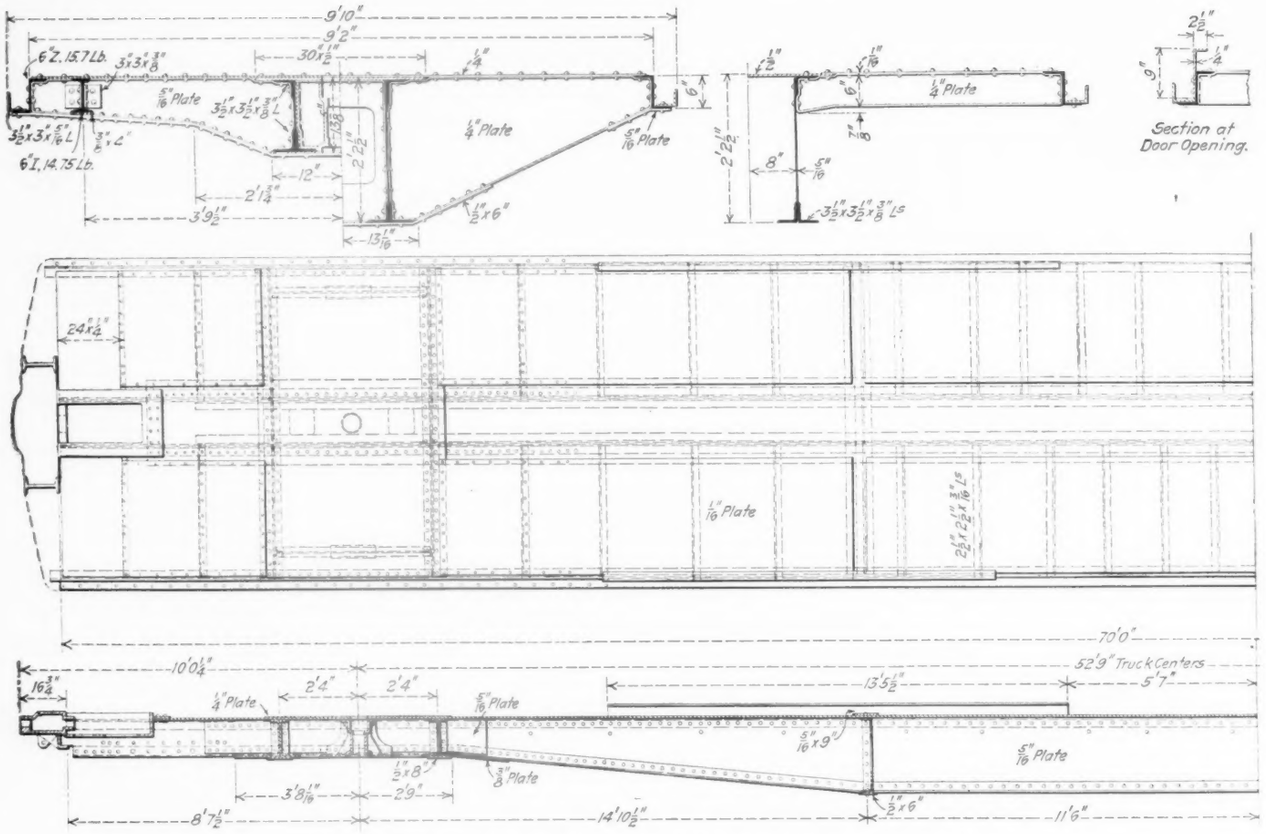
Arrangement of Built-Up End Construction for the 70-Ft. Standard Baggage Car

The underframe is made of fishbelly center sills of the built-up type and Z-bar side sills. The center sill webs are of 5/16-in. plate, spaced 16 in. apart and reinforced top and bottom with 3½-in. by 3½-in. by ⅜-in. angle flanges. At the top these angles are applied on the outside of the web plates only, while at the bottom they are applied both outside and inside. The center sill construction also includes a top coverplate 15 in. wide by ½ in. thick. At the deepest section the sills measure 26 in. over the flanges. This section

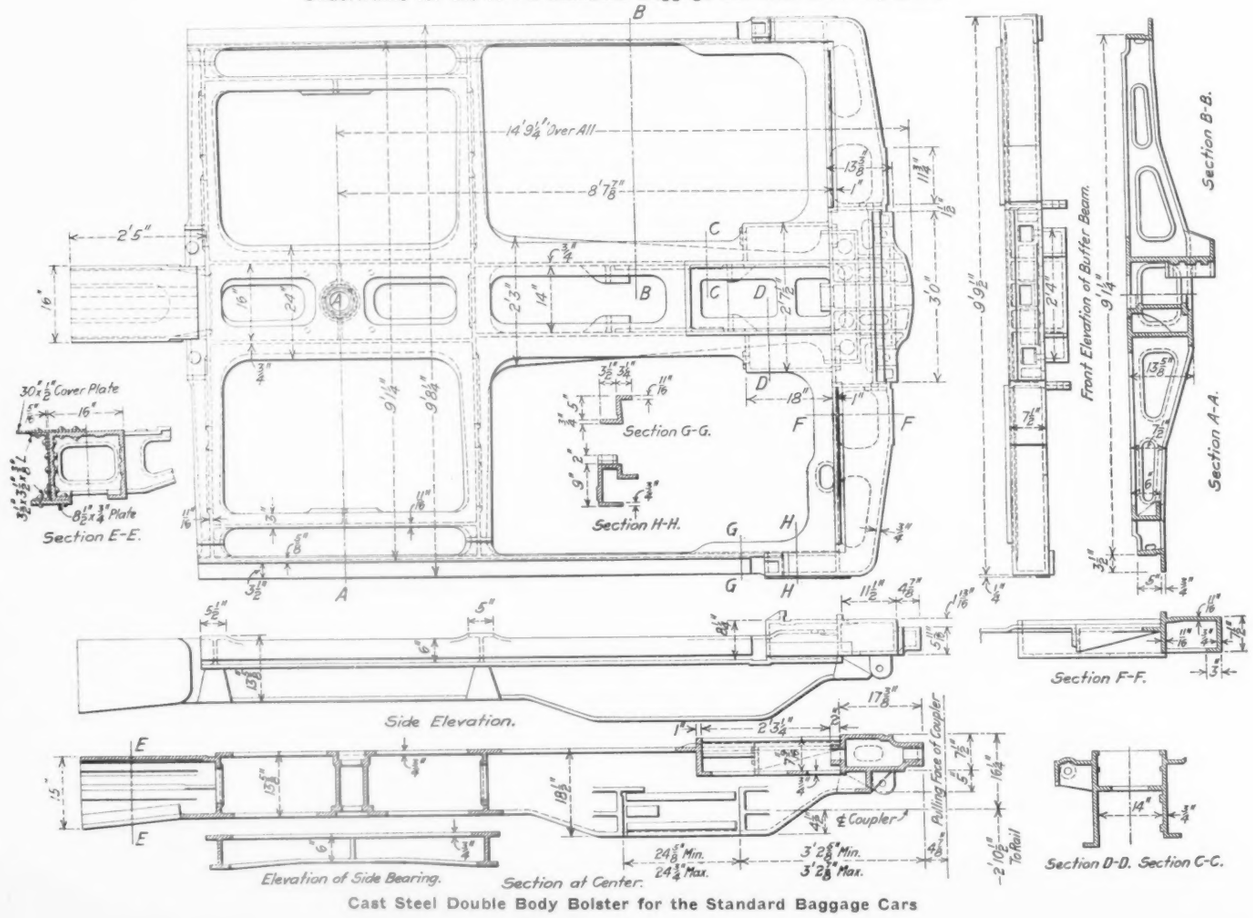


Platform Arrangement—Built-Up Construction

is maintained for a distance of 11 ft. 6 in. either side of the transverse center line, at which points are located the main transverse members. At these members the reduction in the depth of the section begins and reaches the minimum of 12¾ in. over the flanges at the back side of the double body bolsters. The principal transverse members are built up of ¼-in. single flanged diaphragms with fillers of the same thickness between the sills, and have continuous top coverplates 9 in. wide by 5/16 in. thick. A ½-in. by 6-in. plate, about 55 in. long, is riveted to the bottom flanges of the dia-



Underframe for the 70-Ft. Standard Baggage Car with Built-Up Ends

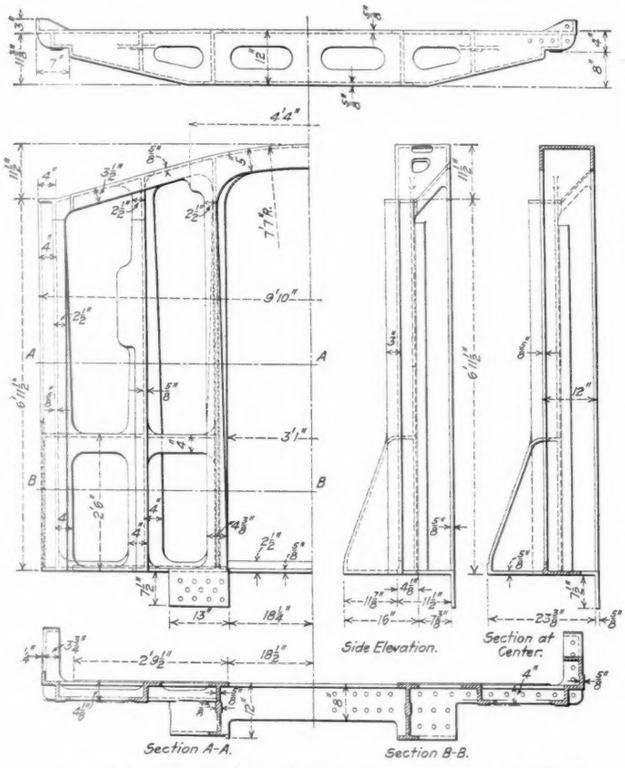


Cast Steel Double Body Bolster for the Standard Baggage Cars

Make the Fourth Loan a Success!

phragms, the center sill filler, and to the center sill flanges.

The bolsters and end construction of the underframe may be either built-up or of unit cast steel construction. In the



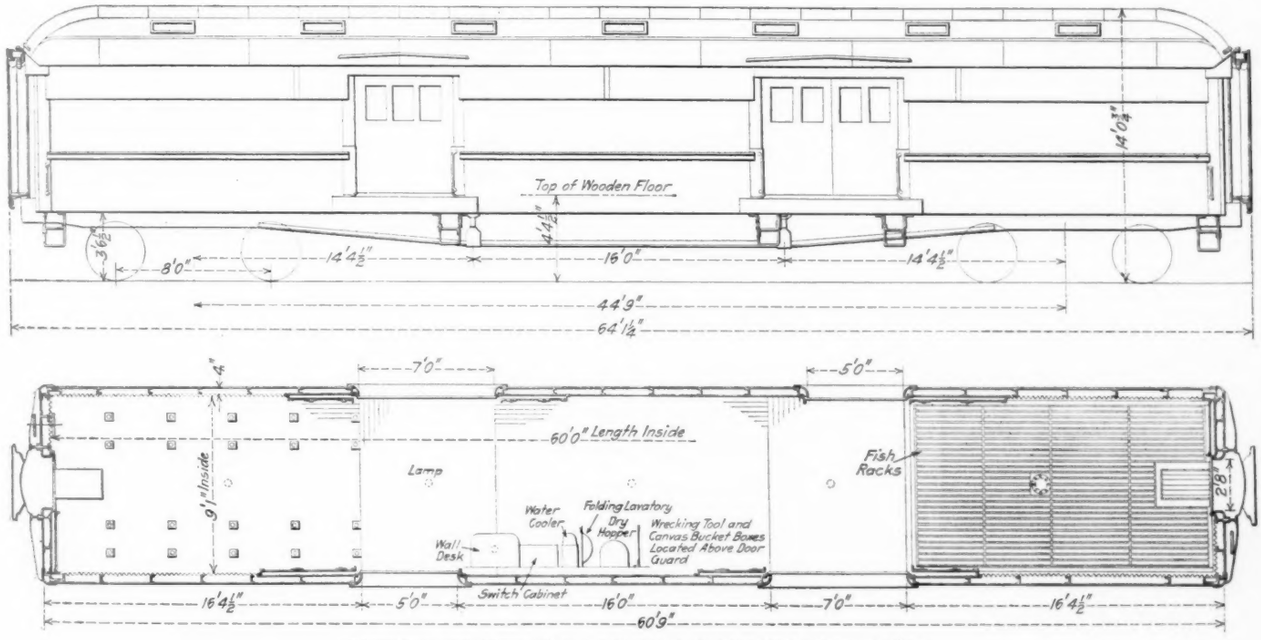
Details of the Cast Steel End Frame for the Railroad Administration Standard Baggage Cars

built-up underframe the center sills extend through to the end of the car body, the spring buffer casting being riveted between them. The transverse members of the double body bolster are each built up of two diaphragms of 5/16-in. plate, placed back to back. A top coverplate, 5 ft. 9 in. wide, is riveted to the flanges of these members, the side sills and the center sills. From a point 16¾ in. forward of the front transverse member of the bolster to a point 24½ in. back of the rear transverse member, the center sills are closed by a ⅜-in. bottom coverplate. The lower flanges of the transverse members are reinforced by ½-in. by 8-in. plates, which are continuous from side sill to side sill. Side bearing supports are provided by 6-in., 14¾-lb. I-beams, placed longitudinally between the transverse members of the bolsters, 3 ft. 9½ in. on either side of the longitudinal center line of the car.

The side sills are 6-in., 15.7-lb. Z-bars, with the lower flanges turned out. A 3½-in. by 3-in. by 5/16-in. angle, with the short leg turned up, is riveted to the lower flange of the Z-bar, the face of this angle serving as a means of attachment of the outside steel sheathing of the car.

Alternate types of construction are provided for the end frame of the car. This may be either a unit steel casting or built up of structural sections. The details of the cast steel end frame are shown in one of the drawings. The built-up construction is designed to be of equal strength to that of the cast steel end, which is stronger than required by the Railway Mail Service specifications. The main vertical members are 12-in., 40-lb. I-beams, framed into the bumper casting at the bottom and built into a transverse girder at the top. There are four intermediate end posts of 4-in., 8.2 lb. Z-bars, two of which are to be omitted in working to the Post Office Department Specifications. The corner posts are built up of Z-bars, placed in the same position as the intermediate posts, and two angles which are so placed as to provide a means of attachment of the outside sheathing at the side of the car and the inside end sheathing.

The side frame is made up of channel posts pressed from ⅛-in. steel. The side plate is a 4-in., 8.2-lb. Z-bar, placed with the web horizontal and the outside flange downward. The top of the belt rail is 3 ft. ¼ in. above the lower face of the side sills. It is made up of the 4-in. by ½-in. strip on the outside, riveted through to a 4-in. by 2-in. by ¼-in. angle on the inside of the sheathing. The sheathing is ⅛-in. plate, to the inside of which is applied ¾ in. of hairfelt



Elevation and Floor Plan for U. S. R. A. Standard Baggage Car

insulation. The interior sheathing is No. 20 corrugated steel.

The carlines are of ⅛-in. pressed channel sections. On

either side these are in one piece from the side plate to the roof of the clerestory with a separate section for the latter. The roof is covered with copper bearing steel plates insulated inside and the ceiling is of sheet steel. The underframe structure is covered with 1/16-in. steel plate, which is riveted to the center sill coverplate, the side sills and transverse supports flanged from ¼-in. plate. On this is laid five 3-in. by 2⅜-in. intermediate longitudinal stringers with specially gained stringers over the top flanges of the side sills. Between these stringers the steel plate is covered with a ¾-in. layer of hairfelt, held in place by 1-in. by 1-in. wood strips placed against the stringers. On the stringers is laid a transverse floor of 13/16-in. by 5¼-in. material, finally surfaced with a maple floor of ¾-in. by 3¾-in. tongued and grooved material, placed longitudinally except between the doors, where it is placed transversely.

The general arrangement of the 60-ft. and 70-ft. cars is similar. The 60-ft. car is carried on four-wheel trucks, while the 70-ft. car has six-wheel trucks. The trucks may be either of the built-up pattern or the cast steel frame type. In either case the general arrangement is the same, being of the equalized pedestal type. The wheels are 36 in. in diameter and are mounted on axles with 5-in. by 9-in. journals. The six-wheel trucks have a wheel base of 11 ft. and the wheel base of the four-wheel truck is 8 ft. Both cars have two doors on each side, one having an opening of five feet and the other of seven feet. The side door on one side is placed opposite the narrow door on the other side of the car. In one end of the car a fish rack is placed over the floor, which is fitted with drainage facilities.

The 70-ft. cars are 70 ft., 9 in. long over the end posts and have a clear length inside of 70 ft. The uncoupled length over the diaphragms is 74 ft. 1¼ in. They are 9 ft. 1 in. wide inside and have a maximum width of 10 ft. 7⅛ in. over the eaves. The maximum height from the top of the rail to the top of the roof is 14 ft. 13/16 in. The 60-ft. cars are 60 ft. 9 in. long over the end posts; they have an inside clear length of 60 ft. and a length uncoupled, over the diaphragm faces, of 64 ft. 1¼ in. The height and width clearances are the same in both cases.

COACH CLEANERS' WAGES

The director general has issued an addendum to Supplement 4 to General Order 27, providing the following rates of pay and rules for coach cleaners:

ARTICLE I—RATES OF PAY

(a) For coach cleaners who were on January 1, 1918, prior to the application of General Order 27, receiving less than 16 cents per hour, establish a basic minimum rate of 16 cents per hour, and to this basic minimum rate and all hourly rates of 16 cents and above, add 12 cents per hour, establishing a minimum rate of 28 cents per hour, provided that the maximum shall not exceed 40 cents per hour.

(b) All coach cleaners shall be paid on the hourly basis.

ARTICE II—PRESERVATION OF RATES

(a) The minimum rates and all rates in excess thereof, as herein established, and higher rates which have been authorized since January 1, 1918, except by General Order 27, shall be preserved.

(b) Coach cleaners temporarily or permanently assigned to higher rated positions shall receive the higher rates while occupying such positions; coach cleaners temporarily assigned to lower rated positions shall not have their rates reduced.

ARTICLE III—HOURS OF SERVICE

Eight consecutive hours, exclusive of the meal period, shall constitute a day's work.

ARTICLE IV—OVERTIME

(a) Where there is no existing agreement or practice more favorable to the employees, overtime will be computed for the ninth and tenth hour of continuous service, pro rata on the actual minute basis, and thereafter at the rate of time and one-half time. Even hours will be paid for at the end of each day period; fractions thereof will be carried forward.

(b) Coach cleaners will not be required to suspend work during regular hours to absorb overtime.

ARTICLE V—APPLICATION

The rates of pay and rules herein established shall be incorporated into existing agreements on the several railroads.

A CORRECTION

In the article on The Design of Offset Beams, published in the September issue on page 514, several typographical errors were made in the closing paragraphs under Fig. 9 on page 516. These have been corrected and are reprinted here as follows:

Substituting the required value of 20,000 for s and x_5 for 1, we have,

$$20{,}000 = \frac{45{,}000 \times 9}{2 \times 5 \times x_4^2}$$

$$\text{or } x_4 = \sqrt{\frac{45{,}000 \times 9}{2 \times 5 \times 20{,}000}}$$

$$x_4 = 1.42 \text{ or } 1\ 7/16 \text{ in.}$$

Similarly

$$x_6 = \sqrt{\frac{31{,}800 \times 9}{2 \times 5 \times 20{,}000}} = 1.2 \text{ or } 1\ 3/16 \text{ in.}$$

$$x_8 = \sqrt{\frac{63{,}000 \times 9}{2 \times 5 \times 20{,}000}} = 1.68 \text{ or } 1\ 11/16 \text{ in.}$$

The shape of the section with these required dimensions is shown in Fig. 8b.

It is necessary to ascertain the angular deflection of the vertical portion of the beam, (m-n in Fig. 9) in order to determine whether the beams will be unduly distorted under the action of the maximum stresses. To find the angular deflection, use the formula

$$\phi = \frac{205\ M_t\ l\ (a^2 + b^2)}{a^3\ b^3\ G}$$

Where

ϕ = angle of deflection in degrees.
M_t = twisting moment, in inch-pounds.
l = length of section subjected to twisting moment, in inches.
G = modulus of elasticity for shear, generally taken as 10,500,000 for wrought iron.

$$\phi = \frac{205 \times 5{,}300 \times 12 \times 2 \times (1.68^2 + 5^2)}{1.68^3 \times 5^3 \times 10{,}500{,}000} = \frac{726{,}000{,}000}{6{,}210{,}000{,}000} = .1165 \text{ deg.}$$

Evidently this slight angular deflection will be of no consequence, and the beam as designed has ample stiffness.

A Piece of Freight 13,000 Feet Long.—Ocean vessels taking oil from the Tampico fields, Mexico, must be loaded some distance out from the shore on account of the shallow water and the lack of harbor facilities; and the oil is conveyed from the shore through pipes laid on the bottom of the ocean. At Agua Dulce, about 70 miles south of Tampico, two such pipes have just been laid by the Texas Company, and each pipe is 2½ miles long. Each was drawn from the shore to its position for use by a tug, assisted by a steamship, the sections having been put together on the shore and loaded on a series of four-wheel trucks, running on rails. This pipe is 8 in. in diameter and each of the two lines weighs about 382,000 lb., or as much as one of the large modern freight locomotives. These pipes are more than twice as long as any of those heretofore in use. At the outer end of these pipe lines connection is made to the tank in the ship by means of flexible metal hose.

DRAFT GEARS SHOULD BE MAINTAINED*

Proper Protection to the Car and to the Lading Requires a System of Periodical Inspection and Repairs

BY L. T. CANFIELD

IN presenting this subject I will not refer to any kind or type of draft gear, but will try to point out the necessity of keeping the device in condition to do its maximum amount of work at all times. It is understood that the duty of the draft gear is to protect the car and its contents from damage due to shocks received in the handling of the equipment. We will treat the question of capacity of draft gears in foot pounds as developed by the 15,000 lb. pendulum hammer. There are draft gears in service ranging in capacities from 5,000 to 45,000 ft. lb. Table I shows the foot pounds of energy developed by cars of different weights moving at different speeds, ranging from 1 to 10 m. p. h. These tables are made to show 60,000, 80,000 and 100,000 lb. capacity cars, both empty and loaded.

No matter with what make, type or capacity of draft gear cars are equipped, the gear should at all times be working as nearly to 100 per cent as possible if damage to cars and lading is to be avoided. The effects of shocks on cars are illustrated by the diagram, Fig. 1., presented herewith showing the results of a series of tests made in the Union Draft Gear Company's laboratory by Professor Endsley, assisted by Mr. Barnard, mechanical engineer of that company. These tests were made to show the loss in the strength value of the draft sills by moving the center line of draft below or above the center of the channels. This diagram is shown in order to compare the difference in pressures on the sills before and after the draft gear is driven solid or closed.

In all of the five tests shown on this diagram, the draft gear used was of the spring type, the cushioning value being two M. C. B. class G springs having a combined capacity of 60,000 lb. By referring to the diagram you will note that it required a six-inch fall of the hammer to close the springs, at which time the pressure on the sills was approximately 60,000 lb. In one instance it went up to 72,000 lb. or an average of 12,000 lb. for each one inch fall of the 15,000 lb. hammer.

Selecting test No. 4 for comparison, it will be noted that at the 14-in. fall of the hammer, the maximum strength without over-straining the sills was reached, showing a pressure of 1,025,000 lb. Deducting the 72,000 lb. pressure developed at the six-inch fall while the draft gear was working there remains 953,000 lb. pressure that was developed on the sills between the 6-in. and 14-in. falls, which represents an increase of 8 in. over the fall required to close the draft springs. Dividing this by eight, in order to get the pressure for each inch of drop, the result is 119,125 lb. for each one-inch fall of the hammer after the draft gear is closed, which is approximately ten times the average pressure on the sill while the draft gear is doing its work. Therefore, if this spring draft gear was not properly maintained or its capacity allowed to decrease to the extent of a loss of one-inch drop, making it close at five inches, the result on the car would be a loss of 12,000 lb. in draft gear capacity and the imposing upon the car of 119,125 lb. additional stress.

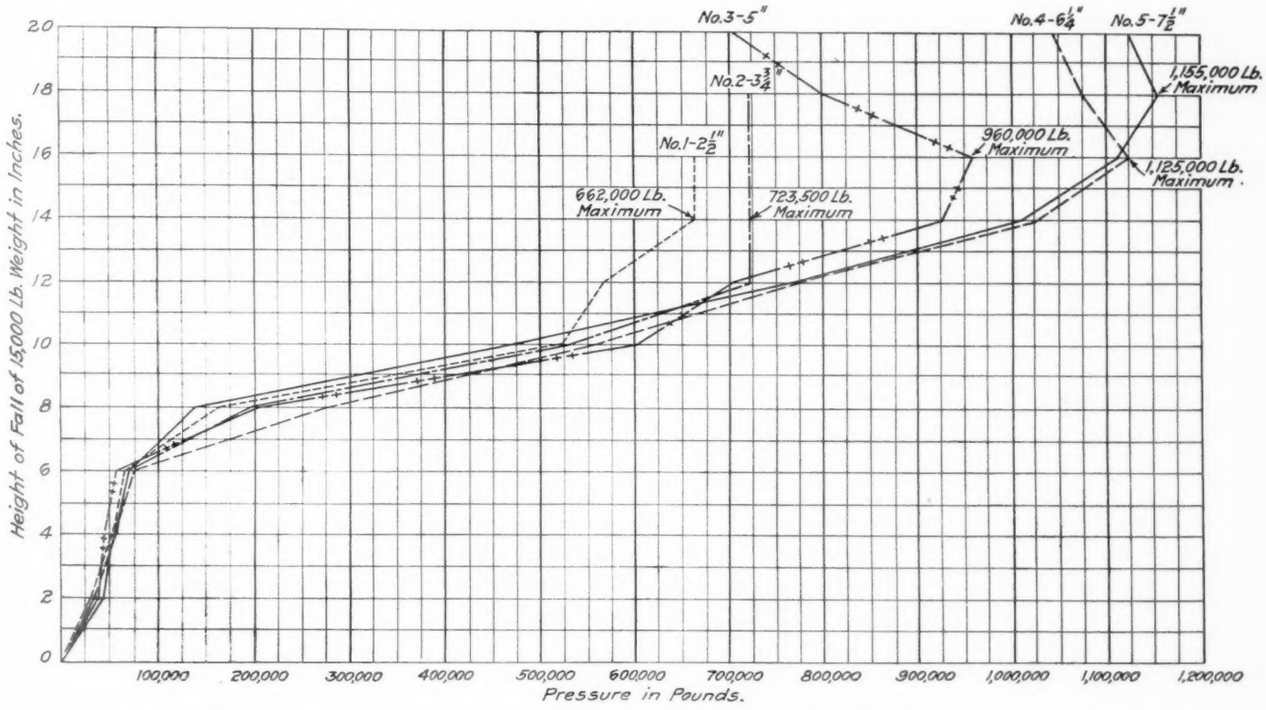


Fig. 1—Diagram Showing Strength Values of Sills Obtained by Varying the Location of the Center Line of Draft.

Most modern draft gears have capacities ranging from 15,000 to 30,000 ft. lb. when tested by the pendulum hammer

*From a paper presented before the Car Foreman's Association of Chicago.

which is probably the best method of testing when attempting to show the effect on the cars. However, there are draft gears in service that will work up to a 38 in. drop of the 15,000 lb. hammer developing a capacity of 47,500 ft. lb. under which condition the pressure on the draft sills would be less than 300,000 lb.

We are told by men who make a study and test a great many couplers, that the new M. C. B. type D coupler will fail at a pressure of approximately 900,000. This failure would be represented by a shortening of the coupler equal to one inch in its length. The older type of couplers will develop the same failures at 600,000 lb. pressure. By reference to the diagram, Fig. 1, it will be noted that over 1,000,000 lb. pressure is developed on the sills between the 6-in. and 16-in. drops, therefore, a draft gear that will not be closed or driven solid with a 16-in. fall of the 15,000 lb. hammer is not only saving the draft sills but the couplers as well.

With the explanation of the difference in pressures on the cars when the draft gear is working and after it has been closed, showing that if the draft gear is not working the effect of the shock on the car can be multiplied by ten, I think we should begin to look into the best method of maintaining the draft gears.

The first point is that in repairing a draft gear, the repairs should be made in such a manner that it will retain its full travel. I know that I myself have repaired cars by applying solid followers in order to take up the slack, thinking that by removing the slack I was doing good work. To prove that this is wrong I would call your attention to the diagram shown in Fig. 2, which represents a 60,000 lb. capacity draft gear with 1¾-in. travel. The whole area of the triangle is the maximum amount of work possible with this type of a gear and would be represented by a 6-in. drop.

Should this gear become slack making it necessary to apply a follower ½ in. thick to compensate for the set in the draft springs, there would be a reduction in the working capacity of the draft gear as shown by the shaded portion of the diagram which is a loss of nearly one-half of its efficiency. As explained above, as long as the draft gear is working the pressure on the car amounts to 12,000 lb. for each one-inch fall of the hammer; therefore, should we lose by the introduction of the slack follower, the working value of the draft gear equal to one or more inches drop, we add to the stresses on the car 119,125 lb. for each one-inch loss in draft gear work. Hence, it is bad practice to attempt to use draft springs that have taken a permanent set or do not measure up to their full travel. It would be economical to put these in the scrap pile and save the damage to the couplers or other parts of the car that fail. Draft gears should be maintained to their designed travel and any part of their mechanism that shows that it has suffered a loss in its working value should be discarded and a new part substituted.

In order properly to maintain the draft gears they should be treated in the same manner as the air brake, for instance a safe working life should be agreed upon and to start with the name and type of the draft gear, the date it was applied and its working travel should be stenciled on the draft sill. I am not prepared to say what is the safe working life of the different makes of draft gears, but assuming three years, I think a positive rule should be put into effect that at the expiration of the three years the draft gear should be removed from the car, inspected and repaired and made as good as when new. This rule should act the same as the rule for maintaining air brakes. In case a car is found where the draft gear has run beyond its allotted time without being removed, the repairs should be compulsory on the road having the car in its possession and the owner of the car should be responsible for the cost of such repairs.

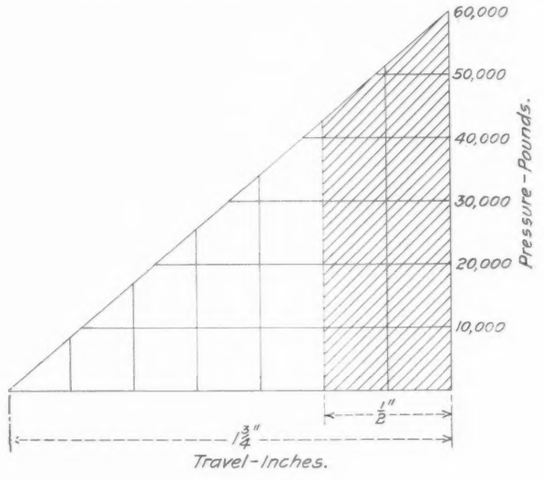


Fig. 2

When you have put into effect this or a similar rule, the cost of maintaining equipment and the loss due to damaged lading is going to be materially reduced, as you can readily see the advantage of maintaining a device that will only register one-tenth the force on the car when it is working compared to the amount registered after it has been closed. Some may believe that this will create an extra amount of work on the cars, but when they see the large number of couplers that fail, ends pushed out by lading, superstructures

TABLE I—ENERGY IN MOVING CARS AT VARIOUS SPEEDS

Velocity		Weight of car.....33,000 lb. Weight of load.....60,000 lb. 10 per cent excess... 6,000 lb. Total load.....99,000 lb. Energy in foot pounds		Weight of car..... 39,000 lb. Weight of load..... 80,000 lb. 10 per cent excess.. 8,000 lb. Total load.....127,000 lb. Energy in foot pounds		Weight of car..... 45,000 lb. Weight of load.....100,000 lb. 10 per cent excess.. 10,000 lb. Total load.....155,000 lb. Energy in foot pounds	
M. P. H.	F. P. S.	Light	Loaded	Light	Loaded	Light	Loaded
1.	1.466	1,102	3,306	1,303	4,244	1,504	5,179
1.5	2.2	2,481	7,443	2,932	9,548	3,383	11,660
2.	2.933	4,414	13,240	5,216	16,980	6,018	20,730
2.5	3.666	6,895	20,680	8,149	26,540	9,402	32,380
3.	4.4	9,934	29,800	11,740	38,220	13,500	46,650
3.5	5.133	13,514	40,540	15,970	52,000	18,420	63,490
4.	5.866	17,654	52,960	20,860	67,940	24,070	82,920
4.5	6.6	22,350	67,050	26,410	86,010	30,480	105,000
5.	7.333	27,590	82,770	32,600	106,140	37,620	129,600
5.5	8.066	33,380	100,140	39,450	128,500	45,520	156,800
6.	8.8	39,730	119,190	46,950	152,900	54,180	186,600
6.5	9.533	46,620	139,860	55,090	179,400	63,580	219,000
7.	10.266	54,120	162,360	63,860	208,000	73,700	253,800
7.5	11.	62,080	186,240	73,360	238,900	84,650	291,600
8.	11.733	70,630	211,890	83,470	271,800	96,310	331,700
8.5	12.466	79,710	239,130	94,250	306,900	108,700	374,600
9.	13.2	89,390	268,170	105,600	344,000	121,900	419,900
9.5	13.933	99,600	298,800	117,700	383,400	135,800	467,800
10.	14.666	110,200	330,600	133,300	424,400	150,400	517,900

racked, roofs loose, draft sills, end sills and in fact all parts of the car destroyed in performing the work of the draft gear, it appears the great waste of labor and materials is in not keeping the draft gear as near to full efficiency as possible at all times.

I would strongly recommend the building up of a force of draft gear men who would be experts just the same as you were forced to build up a force of expert air brake men in order to get the benefit of the air brakes. These men should avail themselves of laboratory investigations and talks with men who have made a study of draft gear just the same as the air brake men had to do when they started out. The draft gear is of even more importance than the air brake to the safe and economical handling of car equipment.

DISCUSSION

In the discussion emphasis was laid on the fact that after the safe speed for switching cars is passed a very slight increase in the velocity increases the energy stored in the car greatly and multiplies the damage to equipment. The necessity for maintaining the maximum travel of draft gears, especially on heavy equipment, was brought out. If the draft gears had higher capacity there would be fewer bad order cars, as shocks damage not only the draft gear and rigging, but the entire car. The speakers expressed the opinion that from 80 to 90 per cent of the bad order cars were due to poor draft gear and draft rigging.

THE JOURNAL BOX PACKING SITUATION

Among the materials used on the railroads which are becoming scarce due to the war, none is more important than journal box packing. The requirements for all the roads of this country are estimated at about 20,000,000 lb. per year. At the present time the best of the wool wastes formerly used for packing are being reworked into yarn and used for blankets, etc.

In order to secure the necessary amount of packing it will probably be necessary to use substitute materials. In the past the principal stocks used for journal box packing have been woolen and cotton waste. In some cases other materials were added but these formed the basis of all the mixtures.

As the function of the waste used in packing is to carry oil to the journal, the first requirement in material used for this purpose is the ability to raise oil by capillary action. The waste should be resilient when soaked with oil so that it will keep in contact with the journal. Furthermore, it should not disintegrate under the action of the oil and should be of such a nature that it can be cleaned and reused. Wool waste has more resilience than cotton but cotton absorbs and carries the oil by capillary action better than wool. Inasmuch as resilience is absolutely necessary to get good results, wool waste has been used almost exclusively for passenger car and locomotive service and for most freight car service, though, of course, the mixtures contained some cotton.

Before discussing the possible means of overcoming the shortage of woolen waste it may be of interest to enumerate the materials entering into the various mixtures used for journal box packing.

DESCRIPTION OF MATERIALS

Axminster and Brussels Carpet Yarn.—This is composed of the clippings and ends from the carpet looms and is the highest grade of wool yarn. This material is getting very scarce as the better grades are being reclaimed and respun. The price is now nearly four times what it was three years ago. It is undoubtedly the finest material for packing waste but its price prohibits the use of it in large quantities. It can be reclaimed practically as good as new.

Shredded Wool Carpet.—Shredded wool carpet is not as good as new wool yarn as the fibre is shorter but it is good material if properly combined with other longer fibred materials. In shredding it, a small amount of oil is usually used in order to get the best results. Shredding should be done so as to produce the minimum of short broken threads and any pieces of unshredded carpet should be picked out. An excess of oil is sometimes found in this stock.

Shredded Linsey.—This is a very poor grade of material secured by shredding Linsey carpets. It is dirty, short fibred and practically all cotton. It is undesirable for packing waste and should only be used if nothing else is available. It yields practically nothing in reclamation.

Domestic Merino.—This material is the waste product of the hosiery and clothing mills. Its wool content varies from 40 to 80 per cent. It should be well twisted, long, clean and resilient. Different lots vary greatly in the length of fibre and general quality. It is very good material for incorporation in journal box packing. It comes mainly from New England and the supply is beginning to fall short of the demand. In former years large amounts were imported from England. At the present time this source of supply is not available. A low grade is imported from Japan.

Muck Yarn Waste.—The term "muck yarn" is generally used to cover all the respun yarns though the higher grades are sometimes called "respun" yarns. Its wool content varies from almost nothing to about 75 per cent. It is made from sweepings, fly, cow hair and various other materials, and is sometimes dyed bright colors to make it look like carpet yarn. It is very short fibred and breaks up very easily. The mixing machine breaks it up to a certain extent and when it is in packing service it goes to pieces rapidly, and as a result causes what are known as "wiper" hot boxes. Its use in packing waste is very undesirable. Its cost is rising as it is being used in the manufacture of cheap blankets, etc.

Cocoanut Fibre.—This fibre is shipped from the Philippines, India and Central America. Before being used it must be machined. In this machining a certain amount of oil is usually added. It will not carry oil to the journal but it does soak up a little oil and after considerable service it often breaks up. The resulting small particles are undesirable in the journal box. It will burn in case the journal gets very hot. The greatest difficulty in connection with its use lies in the fact that it is a difficult matter to incorporate it properly in a mixture of waste. Packing containing cocoanut fibre should be run through the mixing machine at least twice to get it properly mixed. If there are balls of it separate from the wool, trouble will be experienced with the journal box in which it is used. It is also troublesome when waste is reclaimed in the centrifugal machine. The purpose of incorporating it in waste is to give resilience. While cotton is the best oil carrier, it is not resilient and now that the high grade wool yarns are so scarce, the fibre is used to give this resilience which the cotton content lacks.

Tampico.—A coarse vegetable fibre used for making brushes and cheap ropes. It is used in some mixtures to increase the resiliency.

Jute.—The fibre obtained by maceration from the inner bark of the jute plant, used in the manufacture of gunny sacks and ropes. Its use in packing should not be permitted.

Moss.—This moss comes from Florida. It is retted to remove the hard portions. It will not absorb oil. It is considered by some to be superior to the cocoanut fibre, but it is open to practically all the objections which have been raised to the latter.

Asbestos.—This is sometimes used in packing mixtures. It is of no advantage and merely adds to the weight.

White Spooler.—The most common ingredient of good white waste. It is soft but often short fibred.

Shredded New Colored Rags.—This material is often prohibited in specifications for colored waste, but under present conditions such restrictions result in much higher cost. The per cent should, of course, be kept down and the grade held up. Some of this shredded rag stock is fine, soft material. Shredded old rags is a rather poor stock as the old rags are often partially rotted. All cotton stock for journal packing should be free from hard, sized threads.

White Cop.—This is the finest of all cotton waste stock and the amount available is limited. Certain amounts of it are put in the higher grade cotton waste mixtures.

White Waste Machined.—Only small amounts of white waste are used, as colored waste answers the purpose and is easier to get. A high grade colored waste costs as much as white waste. The finest white waste is the "cop" which is scarce and only small amounts of it are usually incorporated in the mixture. The sized slashed threads are undesirable as they are hard and coarse.

MIXTURES USED FOR PACKING

A good grade of wool waste stock for car packing contains about 75 per cent of shredded wool carpet and 25 per cent of domestic merino. This is suitable for use in either passenger or freight cars. It can be secured at a reasonable price. Other typical mixtures now in use are made up of about 50 per cent wool carpet and merino, 35 per cent cotton and 15 per cent vegetable fibre. The maximum permissible proportion of threads shorter than three inches is usually limited to from 25 to 40 per cent. The moisture content is limited to about 8 per cent. The constituents are run through a mixing machine one or more times to get them evenly distributed in the packing and also to improve its resiliency.

It may prove necessary to use packing containing smaller proportions of wool than in the mixtures given above. The supply of cotton stock is ample, although the price is high, and this will probably come into more general use. The principal objection to cotton packing is that it lacks resiliency and, therefore, does not remain in contact with the journal, though it is theoretically the proper material for carrying oil since its capillary properties are nearly twice those of wool. Numerous methods of securing the necessary resiliency with cotton packing have been tried. Steel wool, cocoanut fibre and moss are sometimes mixed with the packing to give resiliency, but all of these are open to numerous objections, such as breaking to pieces, matting, preventing reclamation, etc., and some of the roads which have tried them have had to abandon them.

RECLAMATION OF PACKING

As the supply of raw materials for use in packing is constantly decreasing, every effort should be made to reclaim it. All roads should install proper plants for the reclamation of both wool and cotton waste. Roads that have provided such facilities should see that all available material is sent to the reclamation plants. The cost of reclaiming wool waste is more than made up by the value of the babbitt reclaimed and the oil secured is a large item. The methods of reclaiming packing in general use are described below:

Method No. 1.—The dirty packing is shipped to the reclaiming plants in barrels. At these plants it is first heated in a large vat surrounded by steam coils. It is then placed in a centrifugal wringing machine, similar to those used in laundries. It is revolved in this machine for a period of about five minutes; during this process the oil is thrown out of the packing and a considerable amount of the dirt passes out with it. Still more of the dirt and the heavy particles of babbitt settle in the bottom of the machine. The packing is then removed from the machine and picked over by hand. Inasmuch as the packing is practically dry, the dirt separates from the wool very easily, leaving a clean material without the dirt or short fibre. This packing is then put in the mixing vat and used similar to new packing. The oil which is removed in the centrifugal machine is passed through a series of four fine screens and a bed of curled hair or charcoal. The reclaimed oil is perfectly satisfactory for use the same as new oil. The babbitt is melted down and skimmed and babbitt blocks made for issuance as new babbitt.

Method No. 2.—The packing is taken directly from the barrels and placed in a large vat of oil which is heated by means of steam pipes. It is forked and stirred around in order to wash the dirt from the packing with the oil. When it is sufficiently well cleaned it is put into a second vat where it is mixed ready for service. The vats are cleaned out and the material from the bottom is put in an air driven press and the oil squeezed out. This oil is cleaned by means of a centrifugal machine and the oil is used over.

METHODS OF RECLAIMING COTTON WIPING WASTE

The dirty waste should be shipped to a central plant which is fully equipped for this work. The waste should first be washed either with gasoline or lye and soda ash. It should then be wrung in a centrifugal wringer and dried in a specially constructed oven or, if this is not available, on steam coils. It will be found necessary to have special tanks prepared for the first washing. In case the lye and soda ash method is used, special skimming devices are necessary to remove the dirt and grease which comes to the surface. Care must be used in the handling of waste from the paint shop to avoid danger of fire from spontaneous combustion.

In the past, few roads have paid enough attention to journal box packing to insure that it was handled properly. The present conditions demand that this policy be changed in order to avoid a serious shortage of such material. The term "waste" should be confined to stock used for wiping. The mixtures used for packing boxes should be referred to as "journal box packing." The improper use of the term "waste" is largely responsible for the lack of care in handling this material, which is generally regarded as a waste product. All roads should issue definite instructions to the mechanical department employees as to the methods of packing journal boxes and reclaiming packing.

MAINTENANCE OF AIR BRAKES

The regional directors are now giving special attention to the proper maintenance of air brakes and are addressing letters to their federal and general managers as follows:

The proper maintenance of air brakes on all classes of equipment is an important matter from many points of view and is a subject that is not given the careful attention it should be given. In addition to the impossibility of properly handling and controlling trains with poorly maintained brakes and leaky pipes, hose and other apparatus, fuel losses from these causes are startling. It is estimated that there is a waste of more than 6,000,000 tons of coal annually due to train pipe and other air leakage. The shortage of coal makes it necessary now, more than ever before, to bring about greater efficiency. The proper maintenance of air brake equipment will not only contribute to a large extent in fuel saving, but will also reduce maintenance costs and improve your train operation.

The following should be rigidly enforced:

Ample time allowed for inspection of air brakes.

All leaks and defects properly repaired.

Air brakes should be thoroughly gone over, cleaned and tested on all cars on shop or repair tracks and all leaks eliminated.

Train pipes, cylinders and all parts should be securely clamped. This is a matter that is given little attention.

Careful inspection of hose should be made to detect porous hose and to see that hose fittings are securely clamped. Poorly clamped fittings often result in hose being blown off, resulting in wrecks or serious damage to equipment.

Wherever possible train yards and shop tracks should be equipped with yard testing plants to enable inspectors to test cars and trains standing in the yards and make repairs often

before trains are made up, resulting in reducing of terminal delays and overtime.

The leakage on outbound trains after a service reduction of 15 lb. has been made and valve placed on lap, should not exceed 8 lb. per minute. If leakage exceeds that amount the trouble should be corrected.

M. C. B. Rules covering the inspection and maintenance of air brakes should be rigidly enforced.

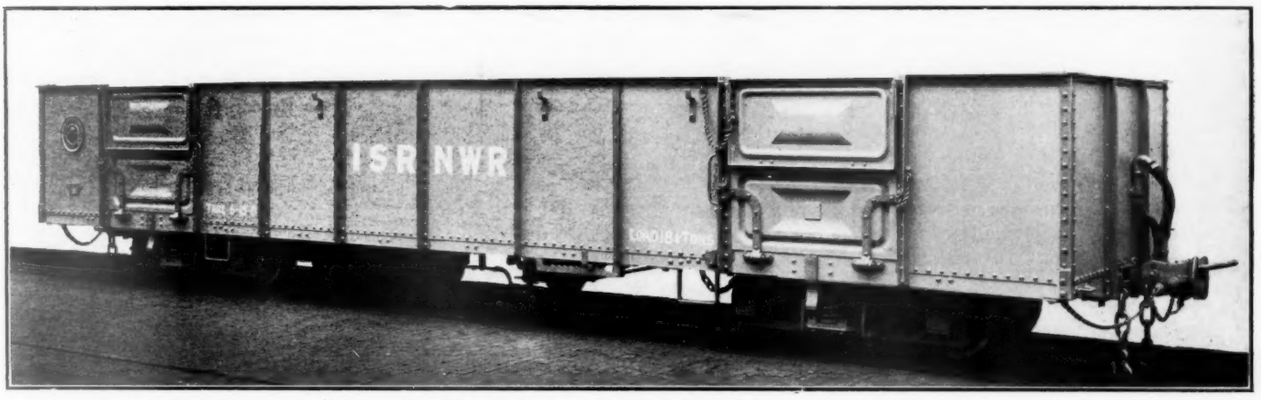
HEAVY FREIGHT CARS FOR A NARROW GAGE RAILWAY IN INDIA

BY FREDERICK C. COLEMAN

By far the most interesting of all the mountain railways in India, or perhaps in the Far East, is the 2 ft. 6 in. gage line connecting Simla, the summer capital of India and the Punjaub and the headquarters of the Indian Army all the year round, with Kalka, and there forming a connection with the East Indian Railway system.

Simla, situated among the foot-hills of the Himalayas at an altitude of 7,116 ft., relied, until November, 1903, upon "tongas," or country carts, for its communication with the outer world. The railway was commenced in 1899 and opened for traffic in 1903, and since January 1, 1907, it has been worked by the Indian North Western State Railway administration. It has a total length of 60 miles of single track throughout. The permanent way consists of 41 lb. flat-footed steel rails, with spikes and bearing plates on wooden deodar ties, but more than half of these have now been replaced on renewal by 60 lb. rails. The line is ballasted with stone, and it is fenced only along the Kalka camping ground and through the outskirts of the town of Kalka.

Most of the curves are compound, the limiting radius being 120 ft. and the ruling grade is 3 per cent, not compensated for curvature. Upon leaving the Kalka junction, where the broad-gage trains stop, the line almost immediately commences to ascend the spurs of the mountains, taking turns continuously until Simla is reached. The spurs are generally of a favorable character and they are taken advantage of when they lie in the right direction, but, where they do not, tunneling has been resorted to. The ridges are connected by "saddles" of varying heights, not always progressive in favor of the ascent, so that the line, having surmounted a ridge, has generally on a curve, and the curvature is formed by making the piers wedge-shaped. The retaining walls are made of dry stone, hand set, of 10 ft. to 15 ft. in width, and bands of masonry 2 feet wide are introduced at intervals of about sometimes to descend. However, as the mountains rise, so do the majority of the "saddles." In spanning mountain gorges and ravines, girder viaducts are not usually employed, but masonry structures called "galleries." These resemble Roman aqueducts, and they consist of tiers of arches rising one above the other until the rail level is reached. They are



Narrow Gage Gondola Car of the Sheffield-Twinberrow Type for the Kalka-Simla Railway, India

Box Car with Sheffield-Twinberrow Underframe and Trucks for the Kalka-Simla Railway

5 feet, according to circumstances. There are no fewer than 21 stations, and the railway carries about 150,000 passengers and 62,000 tons of goods each year.

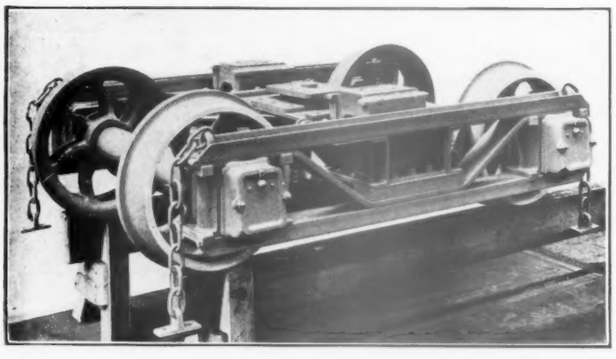
In order to provide facilities for the increasing traffic, additional locomotives of a more powerful type have recently been introduced, the passenger vehicles have been re-designed, and all-steel coaches have largely been adopted.

Simultaneously, a considerable number of all-steel high-capacity freight cars, both open and covered, have been imported from England. Among these are 50 cars of the Sheffield-Twinberrow pattern, built by the Leeds Forge Company, Limited, of Leeds, England, from the designs of George H. Sheffield, of Victoria street, Westminster. They are of two standard types, open and covered, of 42,560 lb. and 39,200 lb. rated capacity, respectively.

The following is a table of the leading dimensions of the open cars:

Length inside and over end sills	30 ft.
Length over buffers and couplers	33 ft.
Height inside	3 ft. 6 in.
Width inside	7 ft.
Width overall	7 ft. 5¼ in.
Centers of trucks	20 ft.
Wheelbase of trucks	4 ft. 3 in.
Diameter of wheels on tread	10 ft. 8 in.
Size of journals	7 in. by 3¼ in.
Centers of journals	3 ft. 9⅜ in.
Tare weight complete, including vacuum brake equipment	14,000 lb.

The over all dimensions, with the exception of the height, are similar in both types of cars and, with the single exception of pressed steel end sills and end longitudinals, only three standard British steel sections are employed in the structures. Cast steel wheels are employed, and these were pressed on the axles under a pressure of 40 tons, the bosses of the wheels



Truck of the Sheffield-Twinberrow Type Used Under Some of the Kalka-Simla Freight Cars

being keyed to the axle seats. The journal boxes are also of cast steel and are fitted with loose key plates and are designed to permit of oil lubrication, either by means of adjustable pads or waste packing. The tare weight of the covered car is 15,350 lb. A number of the covered cars are fitted with water tanks, each of 115 cu. ft. capacity. The weight of the empty tanks and fittings is 1,456 lb. The trucks, underframes and general dimensions of the covered cars are identical with the open cars, but an additional standard British section is employed for the longitudinals and the transverse bracing of the plates and of the roof.

One of the photographs shows the Sheffield-Twinberrow patent truck. The salient feature of this design of truck is that the weight of the car is not carried on the centre, but is distributed through groups of coil springs at a transverse distance of about 16 in. from each side of the centre. The bending moments upon the main transoms are thus considerably reduced, and the effect is to add materially to the reduction in weight of the structure. The springs are compounded to act efficiently when the car is either loaded or empty. They rest in cast steel boxes, the lower parts of which are attached to and between the bogie transoms or bolsters. The upper, or loose, portions of the boxes are provided with large rubbing surfaces, which have a sliding contact, with corresponding rubbing pieces upon the car main transoms. Although tilting action alone is allowed for the extent of the clearance between the center pins and pivot casting, and the spring boxes and the side checks on the bolster frames of the trucks, there is ample provision for lateral and end movement to suit inequalities in the rails or super-elevation.

A distinct advantage in dispensing with the customary swing bolster is the fact that there is no vertical movement of the brake shoes, whether the car be empty or loaded. A uniform wear of the brake shoes is thus ensured and there is the same range of brake levers under either empty or loaded conditions. The weight of these trucks, complete, is 2,556 lb. Some of the covered cars are provided with an additional pair of doors at the top in the centre, as shown in one of the illustrations, and the tare weight of the cars is increased to 15,340 lb.

Several of the open and covered cars recently supplied for use on the Kalka-Simla Railway are fitted with an arch bar truck. The general dimensions of these cars and the structural details are similar to those already described, except that the weight of the truck is 3,192 lb., which increases the tare weight of the cars to 15,120 lb. and 16,910 lb., respectively, as against 14,000 lb. and 15,340 lb., the tare weights of the open and covered cars fitted with the Sheffield-Twinberrow truck.

Courtesy of Liberty Loan Committee

Some Tree

Lend the Way They Fight

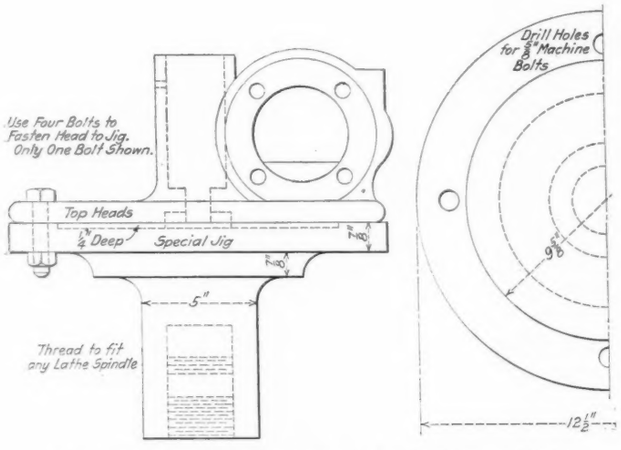
SHOP PRACTICE

RECLAIMING TOP HEADS OF WESTINGHOUSE 9 1-2 IN. AIR COMPRESSORS

BY J. H. HAHN
Assistant Roundhouse Foreman, Norfolk & Western, Bluefield, W. Va.

Some trouble is experienced with the Westinghouse 9½-in. air compressors on account of the threads in the reversing valve chamber stripping. This often makes it necessary to replace these heads. It is an expensive practice to scrap the heads on account of this defect, especially under present conditions, and the sketch shows a special chuck or jig which was designed by H. B. Stratton, a machinist in the Bluefield shops, for holding the heads while boring out the reversing valve bush chamber for the bushing used in reclaiming the heads.

The jig is forged out of wrought iron in one piece and finished all over. After it has been threaded to fit the lathe spindle, and faced off, it is advisable to finish it on the spindle of the lathe on which it is to be used. Four holes are drilled to receive ⅝-in. machined bolts which are used



Jig for Boring out the Reversing Valve Bushing on 9½-in. Compressor Head

to bolt the head on the jig. Only one bolt is shown in the sketch.

By using this device it is not necessary to set up the heads. The jig is threaded to screw on to the lathe spindle and the heads bolted to the jig as shown in the sketch. As the reversing valve chamber is in the center of the head, no adjusting is required. This method shortens the operation of boring and threading the chambers to receive the bushing. The bushings used are of the usual design made of wrought iron, threaded on the outside 10 threads per inch and on the inside to receive the reversing valve chamber cap. The bushings may be made on a turret lathe in quantity and carried in stock. It is imperative that all original dimensions be maintained in making repairs to the top heads, and if necessary to apply a bushing that extends below any of the ports, always re-drill the ports with the proper size drills and test the heads after they have been assembled. The bushings should be applied reasonably tight, after which they are faced off to give the reversing valve bush chamber the proper depth. Heads repaired in this manner will give excellent service and there is reduced chance of the threads stripping.

OXY-ACETYLENE AND ELECTRIC WELDING*

BY A. F. DYER
General Foreman, Welding Department, Grand Trunk, Montreal

With the present price of material, scarcity of labor and difficulty of obtaining steel and iron, welding and cutting by both the electric and oxy-acetylene processes has proved to be a great help and an almost indispensable factor in railroad repair shops.

Seven years ago the Grand Trunk employed one man as an acetylene welder and owing to failures through his lack of experience, the process was nearly condemned, but as we gathered experience both gas and electric welding developed, so that now instead of one man we employ eighteen and often work them overtime.

The low pressure acetylene gas system is used and the whole shops are piped for the acetylene, every other repair pit having a drop connection. In roundhouses we use Prest-O-Lite dissolved acetylene in cylinders which saves the expense of a generator and piping where the process is only in use occasionally.

There are many kinds of electric welding outfits on the market. Our new equipment using alternating current instead of direct current, weighs only 150 lb., gives from 20 to 200 amperes, and is about 50 per cent cheaper than any d.c. machines. The outfit consists of two generators each operating four welding circuits. A panel control allows each man to change current independent of the other welders.

Both of these methods of welding have proved themselves fit to be ranked amongst the greatest time and labor savers introduced on the railroads for a long period. For instance, not long ago a locomotive with a broken frame would be held in the shops for several days as it would take some time for removing the frame, and having it welded in the smith shop, then machined and replaced. Now a frame 4 in. by 5 in. can be cut and welded in less than 14 hours. Frames, when worn by brake gear and stays, are built up and worn holes are plugged and welded instead of reaming them out to a larger size and thereby weakening the frame.

The present price of tool steel demands that none shall be wasted, therefore we use it down to the last inch by welding it to tire steel. Twist drills, taps and reamers when broken near the socket end are welded and put into use again. For this purpose we use either the electric or gas process, but in both cases we use vanadium steel filling rods, as we find this gives the best results. Spokes of driving wheels

*Abstract of a paper presented before the Canadian Railway Club, December 11, 1917.

are welded and flat spots on tires have been successfully welded when it was necessary to do so.

Up to the present time we have not had much success welding cast iron with the iron electrode although with the carbon a fair job can be done, but the gas is unquestionably the best for any of this work. We have successfully welded with oxy-acetylene, steam shovel engine frames and cylinders by welding in patches of cast iron where worn or broken. When our contract for shells was completed and the lathes that were used for this purpose were being overhauled, it was found that most of the V-slide beds were worn by the tool carriers. These were built up by the oxy-acetylene process, which saved machining the beds down as much as ⅜-in. in some cases.

In regard to boiler work, most of the welding is done with the iron electrode using a mild steel or Swedish iron as a filler. It is found that the electric process localizes the heat more than the gas, though it is the writer's opinion that the gas makes a closer and neater weld, as all welds made by the electrode are more or less porous unless they are hammered. When patching a firebox it is better whenever possible to apply quarter or half side sheets in order to get the weld out of the fire. However well a patch is welded, it generally gives out in from twelve to eighteen months' service, and the same applies to cracks, whereas the quarter or half side sheets should last as long as the firebox.

When a nest of small cracks is found round the staybolts, the bolts are removed and the holes countersunk and welded. This method has been found to be very successful. Corner patches are welded by running the patch into the tube or back sheets, as the case may be, at the same time removing the flanges. If it is decided to do away with a number of tubes, plugs are welded in the holes. The holes are countersunk and the plugs are punched by a countersunk die which gives them the proper bevel for welding.

Superheater flues are being successfully welded to the tube sheet. The operators I am connected with prefer to have the flues belled and water in the boiler. This keeps the tube sheet from heating, especially around the smaller tubes. The tubes are set in with copper ferrules set back 1/32 in. and the flues are belled out 3/16 in. to 7/32 in.; the small tubes, 3/16 in. The sheet is roughened all around the tubes and flues, and the oil is then burnt off with the oxy-acetylene flame and tubes and flues welded in with electrode, using ⅛ in. mild steel or Swedish iron. The latter is preferred if calking is needed.

A sample of an average day's work is as follows, for a gang of 12 men:—

14 rivet holes in smoke-box and 4 peg holes in foundation ring.
10 tube holes in upper portion of firebox tube sheet.
2 air pipes which were worn through.
In the tool room:
1 ratchet for jack (2 teeth replaced).
1 gear spindle built up.
1 chuck screw, key end built up.
1 boring shaft built up from 2½ in. to 2⅞ in.
2 tool holders, rebuilt.
1 air hammer handle repaired.
6 teeth in lathe gear, built in.
1 cone, small end filled up solid.
2 1¼ in. holes in top rail of frame filled up.
4 cracks 18 in. long in right side sheet welded.
14 bottom tube holes welded up.
2 washout plug holes built up for re-tapping in round head.
Cut out frame for welding and started welding same.
Welded bushes in pony truck stays.
Cut out 3 sets of boiler tubes.
Cut out one set of superheater flues.
Build up calking edge of first hole.
Heated corners of tube sheet for closing.
Welded broken superheater damper bracket.
Built up reversing lever where worn.
Built up 2 side rods where worn.
Cut out 48 flexible staybolts in firebox.
Welded 2 cracks in throat sheet.
1 broken flange of air brake cylinder.

In addition to this list two men are engaged continuously on cutting around the shops.

For cutting steel and wrought iron the oxy-acetylene process has practically no competitor, it being impossible with the carbon point to cut as fast or as fine and neatly as with the gas torch. For scrapping fireboxes and frames, the carbon point is cheaper to use if time is no object and labor is cheap.

The foregoing examples illustrate only a very small fraction of the uses to which the two methods of welding and cutting are being put in locomotive repair and machine shops, and fresh uses are being found for it every day. No roundhouse should be without an oxy-acetylene outfit, both for repair work and as a part of the wrecking outfit, and all large roundhouses should have both processes, as they would pay for themselves over and over again.

In concluding, I would state that though there are many different opinions as to which is the best process, no shop is complete unless it has both equipments, although the gas has really the widest range.

Welding should not be treated as a side line of the machinists' or boilermakers' business, but should be treated as a trade in itself, as it really is, for it needs the entire concentration of a man's mind, careful study, plenty of practice and a conscientious man to make a welder.

Wherever possible a separate building or suitable space should be provided for bench work, and should be equipped with a suitable furnace for heating and annealing castings. There should also be plenty of floor room for charcoal fires for preheating cast iron jobs before welding.

DISCUSSION

The extreme value of both welding processes was admitted by all, but there was a decided difference of opinion as to the detailed performance of the work. In fact, most of the discussion hinged on the relative value of lap and butt welds in firebox construction.

It was generally admitted that complete fireboxes could be welded by either the acetylene or the electric process, and A. M. Barry, of the St. Lawrence Welding Company, claimed that a safe joint could be secured only by the use of the lap weld. He claimed for the lap weld a high factor of safety, increased stiffness, double strength and added safety, due to staybolts.

The majority of railroad men, however, favored butt welds because of uniformity in metal thickness, more flexibility to prevent staybolt breakage, and less chance of defective welds due to surface scale. With either process, however, attention was called to the absolute necessity of having careful and experienced welders and the need for training such men. It was also recommended that welds be hammered as they are built up.

The possibility of increased tube mileage due to welding was discussed and generally admitted, and Mr. Barry described the application of welded boiler patches with rounded corners, again recommending the lap weld. In response to a question he stated that in his experience the welding of manganese steel was not successful.

TIME SAVED BY PAINT SPRAYING MACHINES

Some interesting figures as to the time required to paint steel hopper cars by the spraying method were obtained from the Carolina, Clinchfield & Ohio at Erwin, Tenn. By the use of paint spraying machines two men have been able to paint and stencil 24 cars in 10 hours. Under the conditions prevailing during the early part of the present calendar year, the cost of labor for painting, stenciling and light weighing the car was approximately 55 cents. The total cost for labor and material for painting one car complete was about five dollars.

MACHINING LOCOMOTIVE DRIVING BOXES

An Interesting Outline of the Work as Performed at the Sacramento, Cal., Shops of the Southern Pacific

BY FRANK A. STANLEY

WHILE the work of machining locomotive driving boxes is a common operation in every shop, the methods followed by the Southern Pacific, in its Sacramento, California, shops is particularly interesting on account of the machine tools used in the work. The various

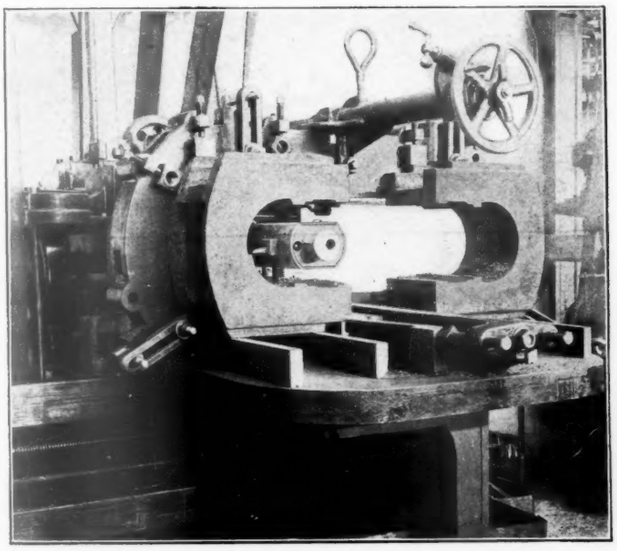


Fig. 1—Planing Driving Boxes on a Draw Cut Shaper

steps in the performance of the work are well shown in the illustrations. Fig. 1 shows a pair of 9 in. by 12 in. driving boxes set up in the chuck on a Morton draw cut shaper

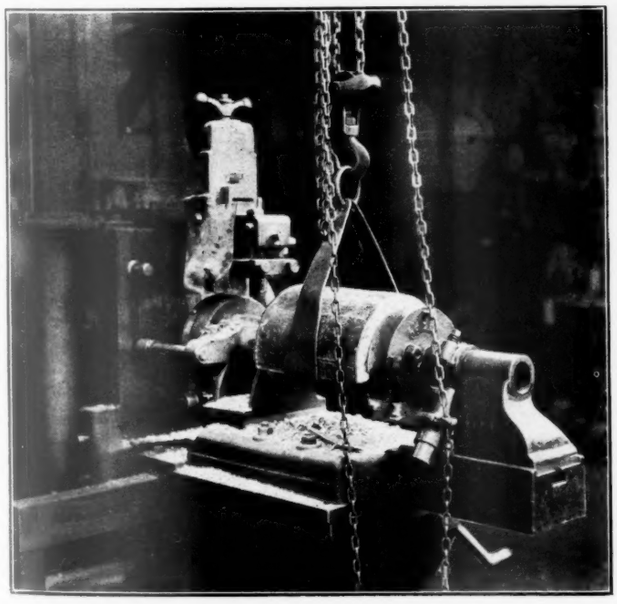


Fig. 2—Setting Brass in Draw Cut Shaper Fixture

where the interior of the jaws are planed out and the circular seat planed to receive the brass. The proportions of the work are well illustrated by this view. The driving box is a steel casting and is machined to receive a brass shell 2½ in. thick. The face of the box is machined for a babbit lining which when finished is ⅜ in. thick.

The method of holding the boxes on the shaper in Fig. 1 is shown sufficiently clear in the illustration. The type of machine used here lends itself admirably to this class of work. Its ram reaching forward through the casting and cutting on the return stroke permits of a heavy feed and deep cuts without chatter and the springing of the tool away from the surface of the work. As shown here, the cutting tool is removing the metal with a depth of cut of about ½ in. and a feed of 3/32 to ⅛ in. per stroke of ram, which means a very reasonable length of time for completing the semi-circular seat for the brass. Running say at 15 complete forward and return strokes per minute, the actual rate

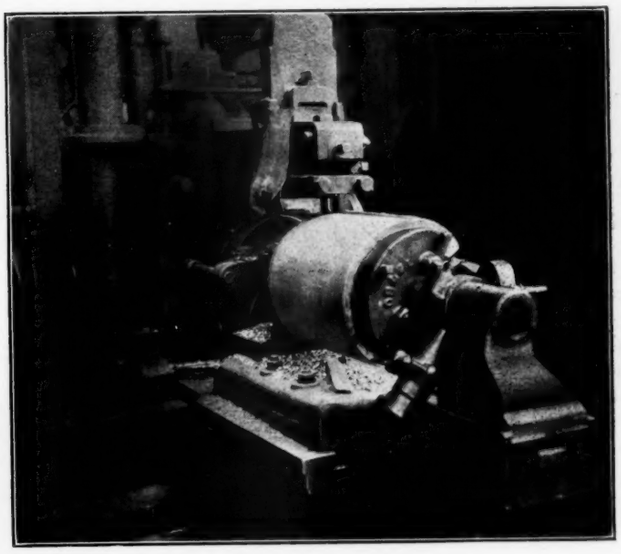


Fig. 3—Planing the Brass

of operation under a 3 to 1 ratio for the noncutting stroke would work out at 25 feet per minute.

PLANING THE BRASSES

The methods followed in shaping the outside of the brasses on the same type of machine is illustrated by Figs. 2 and 3. Here the work is shown mounted between fixtures on a rotary clutch which turns automatically, the amount of the desired feed upon the completion of each stroke of the shaper ram. Fig. 2 shows the convenient method of picking up the work with the sling and hoist to place it in the fixture and the other photograph represents the planing operation nearing completion. The shaper is operated at the rate of 20 complete strokes a minute with a feed of 3/16 in. and a depth of cut ranging from ¼ to ⅜ in. So the finishing of the external surface requires only a few moments and the setting and removal of the work causes but a brief delay between successive brasses.

A homemade press is used for forcing the brasses into their boxes. This press stands near the boring and facing

machine and is also adjacent to the planers where the sides and end of the boxes are surfaced.

PLANING BOXES

The sides of the boxes are planed as in Fig. 4 with two rows of boxes secured to a long fixture on the planer platen so that the entire length of the table is filled with the boxes permitting the use of both tool heads. The fixture is in the form of a long cored casting with outer faces adapted to receive the boxes which are bolted against its opposite faces by the long through bolts, straps and nuts as shown. The work is further secured by straps spanning the gap between

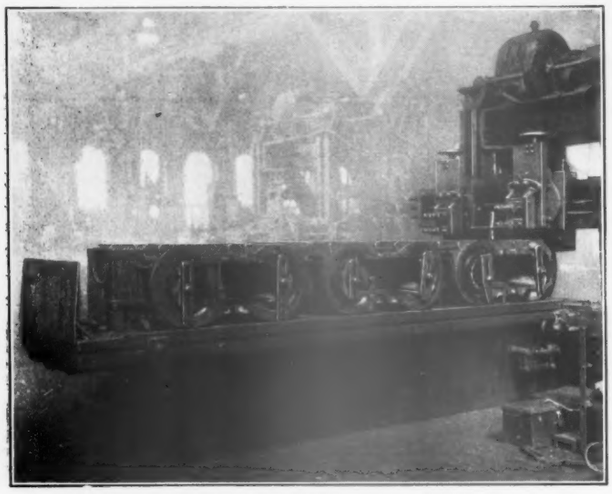


Fig. 4—Planing a Lot of Boxes at one Setting

each pair of boxes and drawing the work firmly down to the platen surface.

The top of the boxes are finished on the draw cut shaper as shown in Fig. 5 where a single box is set up, as indicated, against an upright surface on the side of the table. The method of strapping and clamping here is well indicated in the photograph.

BORING AND FACING

The boring of the brass and the facing off of the babbitted face are performed in the double spindle machine shown at the bottom of the page in Fig. 6, where two boxes are ma-

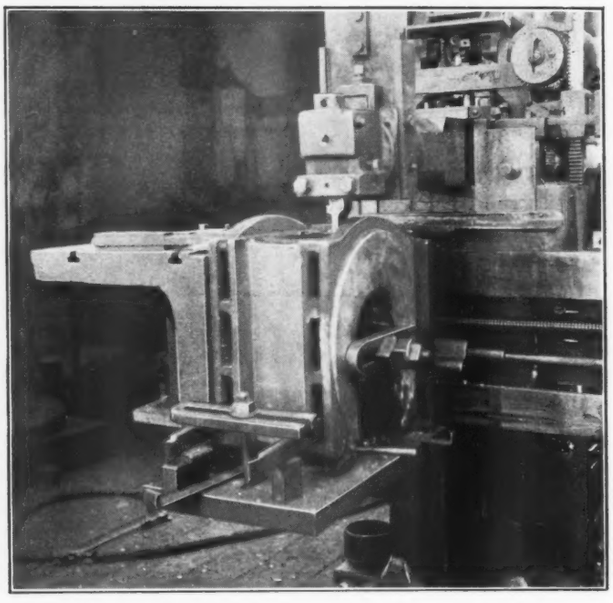


Fig. 5—Planing End of Boxes in Draw Cut Shaper

chined simultaneously, the spindles being set, in this case, at opposite ends of the cross rail. The boxes are secured in the broad face chuck jaws and the practice is to first run two boring cuts down through the work.

The spindle and cutter are operated at 60 turns per minute for the boring cuts and a feed of 1/32 in. per revolution is maintained. The depth of chip for the first or roughing cut is from 3/8 in. to 1/2 in. and for the finishing cut 1/32 in. on a side. The long cutter shown in operation in Fig. 7 is used to finish the babbited face of the box. This

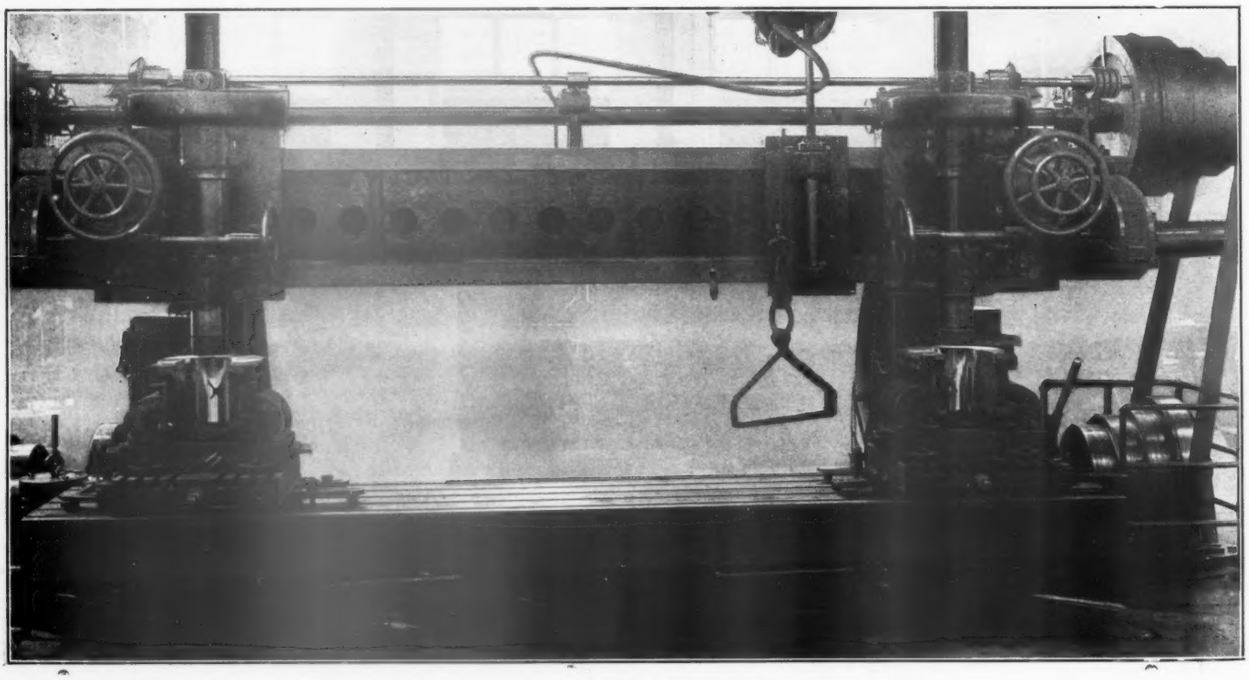


Fig. 6—Machine Used for Boring the Brasses and Facing the Boxes

cutter sweeps over the face of the work at the same speed as that of the boring cutter, or 60 revolutions per minute. When the face is nearly down to the desired thickness the finish on the surface is obtained without chatter by stopping

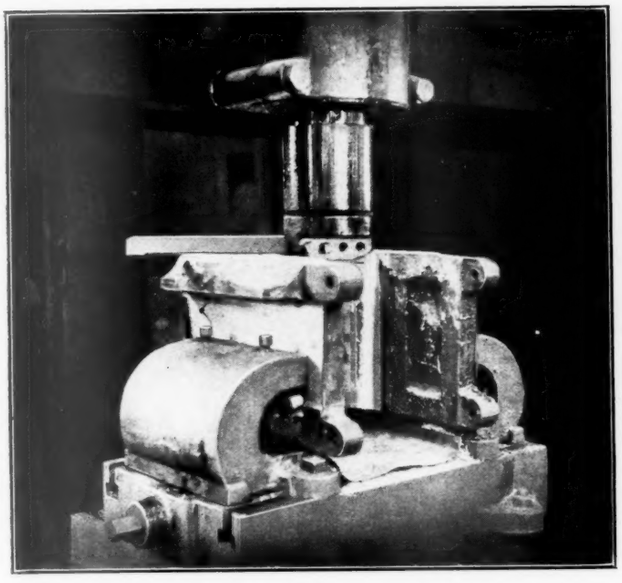


Fig. 7—Facing the Babbitted Surface of the Box

the spindle, then starting it slowly and letting it make two or three revolutions at slow rate of speed to allow the cutter to scrape the surface perfectly smooth. The rounding out of the ½-in. corner is done with the cutter shown in Fig. 8 which has a fillet of the desired radius. The speed of operation is the same as for the preceding cut.

Fig. 9 is of interest as showing one of many guards used on different machines in this plant. The guard is especially

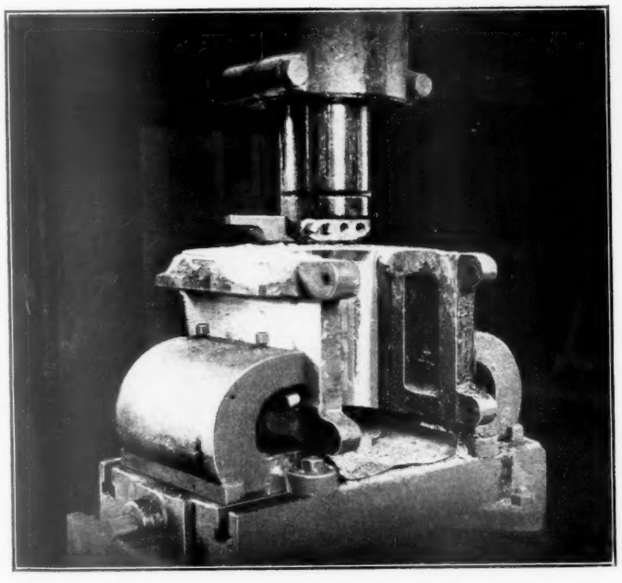


Fig. 8—Finishing the Corner Radius

serviceable on this boring machine owing to the tendency for brass chips to fly, especially when cut at the rate of speed referred to above. This guard is in the form of a sheet metal hood of cylindrical form which has at the front a swinging leaf which may be raised for observation of the work and tools and the whole affair can be slipped off of the work in an instant when the job is completed and as quickly applied after the next box is ready for machining.

Cutting Tool Details.—Details of the facing and corner rounding tools are given in Figs. 10 and 11. It will be seen that the facing tool is made of ¾-in. by 1¾-in. stock and it has a total length of 16 in. The cutting portion is 10½ in. long and is ground off on the edge to give a clearance of

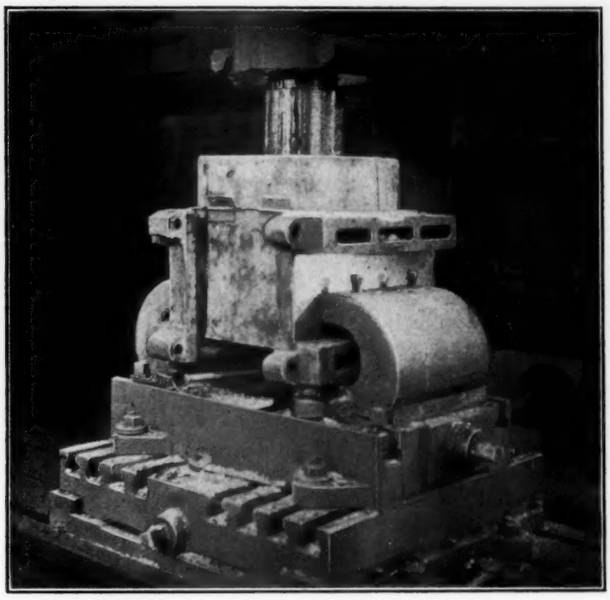


Fig. 9—Safeguard for Preventing Chips from Flying from the Boring Tool

two degrees while a small lip is formed on the cutting face by the concave groove indicated. Although the cut taken by this tool is a broad one the form of lip and clearance provide a clean smooth action. The radius tool, Fig. 11, is of the same size stock as the facing cutter. It is given more clear-

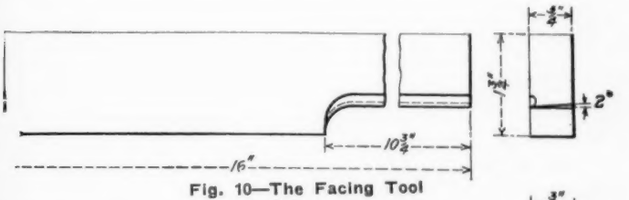


Fig. 10—The Facing Tool

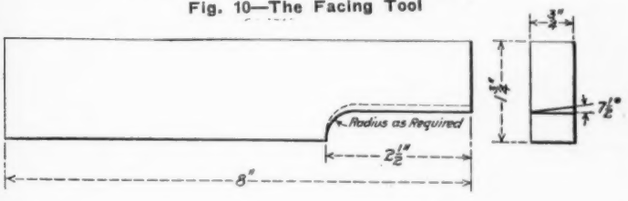


Fig. 11—The Corner Rounding Tool

ance or cutting rake however, the angle being 7½ deg. as indicated in the sketch.

The Director General at Altoona.—In a speech by Director General McAdoo to the railroad shopmen at Altoona, Pa., on September 12, he urged every shopman to put forth his best endeavor in getting locomotives in working order, saying: "Every idle locomotive is working for the Kaiser. Every live locomotive is an American soldier. Every moving locomotive is working for Uncle Sam."

MANUFACTURING SCRAP IRON INTO LOCOMOTIVE PARTS

BY PAUL H. CAIN
Blacksmith Foreman, Michigan Central, St. Thomas, Ont.

The seriousness of the material shortage prevailing in Canada on account of the war has forcibly brought to our attention the necessity for reclamation and conservation. All broken and obsolete parts of locomotive and car equipment, consisting of brake beams, brake rods, levers, chains, bolts, nuts, pins, spring buckles, spring hangers, drawbars, arch bars, axles, frames and any scrap which may accumulate around the shops, are utilized in this process.

These parts are chopped or sheared into pieces not exceeding 12 in. in length, then piled on boards 12 in. by 12 in., each pile weighing about 200 lb. to 250 lb. The piles are then charged into a furnace of sufficient capacity to accommodate 12 piles at one time. They are then heated to the welding point and forged into slabs 2½ in. by 14 in. by 30 in. A pair of grab tongs suspended from a crane is used to handle the material from the furnace to the hammer.

Any number of these slabs are piled together, depending on the size of the forging desired and again welded into a billet, which in turn is forged into the desired shape.

From these billets are manufactured locomotive frames, engine and tender drawbars, main equalizers for the spring rigging, valve motion links and some other small parts. In forging engine and tender drawbars, four slabs are piled together by using a porter bar, welded and forged in the center in one heat and the ends welded, formed and the hole punched with one extra heat each.

One of the best tests we have found for this material is the manufacture of valve motion links. The finished link is carbonized and the heat treatment has proved successful in all cases. The practice which we have found to give the best results in carbonizing these links is as follows:

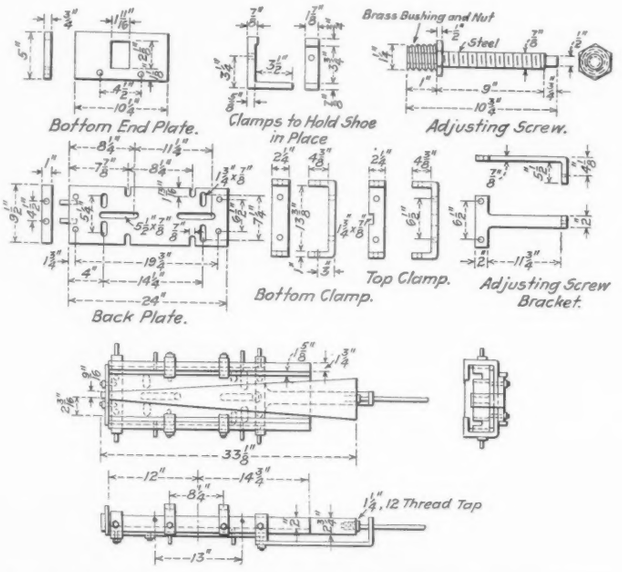
After being heated in the carbonizing furnace for at least 14 hours the box should be removed and allowed to cool. The decalescence point for iron is about 1,650 deg. F., while the decalescence point for carbon steel is 1,440 deg. F. In order, therefore, to secure a refined grain iron on the inside of the case, reheat the link to the decalescence of iron and then quench in water. In order to get the decalescence of the carbon steel case, reheat to about 1,440 deg. F. and quench. This gives both a refined grain of the iron in the core and a satisfactory steel case.

This method of utilizing scrap has proved a great saving. The most important point is to have a good furnace.

FORM FOR BABBITTING CROSSHEAD SHOES

BY J. F. DONELLAN
Master Mechanic, Delaware & Hudson, Oneonta, N. Y.

The drawing shows in detail an adjustable form for rebabbitting crosshead shoes of the two-bar guide type, which is in use at the Oneonta shops of the Delaware & Hudson. The customary practice of babbitting these crosshead shoes requires that the surfaces be finished to size after being poured. With the adjustable guide this becomes unnecessary and the shoes are ready for service immediately after the



Details of an Adjustable Form for Rebabbitting Crosshead Shoes

babbitt is applied. Our experience has been that crosshead shoes rebabbitted in this manner last much longer than when the babbitt is applied in such a way that it is necessary to plane them afterwards. The planing very frequently loosens the babbitt and the removal of the hard outer skin leaves a comparatively soft wearing surface.

The method of operating the form and the details of its construction will readily be understood from an inspection of the drawing.

Scrap Iron Cut and Piled Ready for Heating

New Devices in Soo Wheel Shop

Shifting Platforms at Press and Automatic Discharging Axle Carrier Add to Efficiency of Plant

THE methods of handling work in the wheel shop of the Minneapolis, St. Paul & Sault Ste. Marie at Minneapolis were described in these columns a few years ago.* Since this article was published, however, a number of interesting devices have been added to the equipment which have materially increased the capacity of the shop. Although the plant is comparatively small it has handled as many as 2,200 pairs of wheels in one month. The principal alterations made since the previous article consist of the addition of devices for facilitating the work of the dismounting press and for handling material to and from the machines.

The wheel dismounting press is fitted with attachments which make it possible to handle wheels very rapidly and it has been found desirable to arrange the track leading to the press to accommodate a larger number of wheels than could be placed on a single track, so a gauntlet has been installed. At the end where the wheels are received guides are provided so that the wheels when unloaded from the cars can readily be placed on the rails.

The wheels as they come to the other end of the tracks are not in the proper position to roll into the press, and to bring them in line a shifting platform has been installed in the floor. This platform, which is shown in Fig. 2, extends transversely a little more than the width of the track. Opposite the two inner rails are dogs, *AA*, which set about ½ in. from either track they strike one of these dogs. Pressing down the right hand dog causes the platform to move to the right one-half the distance between the rails, thus bringing the wheel in line with the press. The left hand dog likewise moves the platform to the left. As the wheels roll off they press one of the dogs, *BB*, bringing the platform back to the original position.

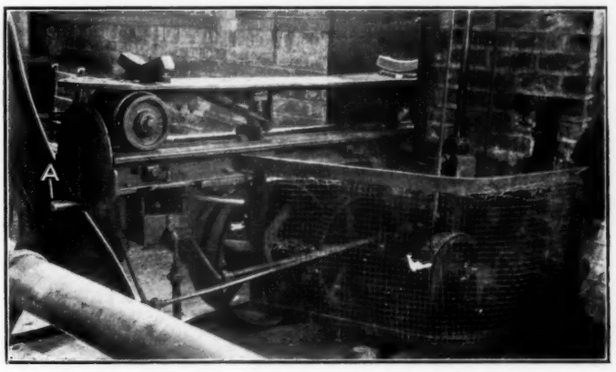


Fig. 2—Axle Carrier and Driving Mechanism

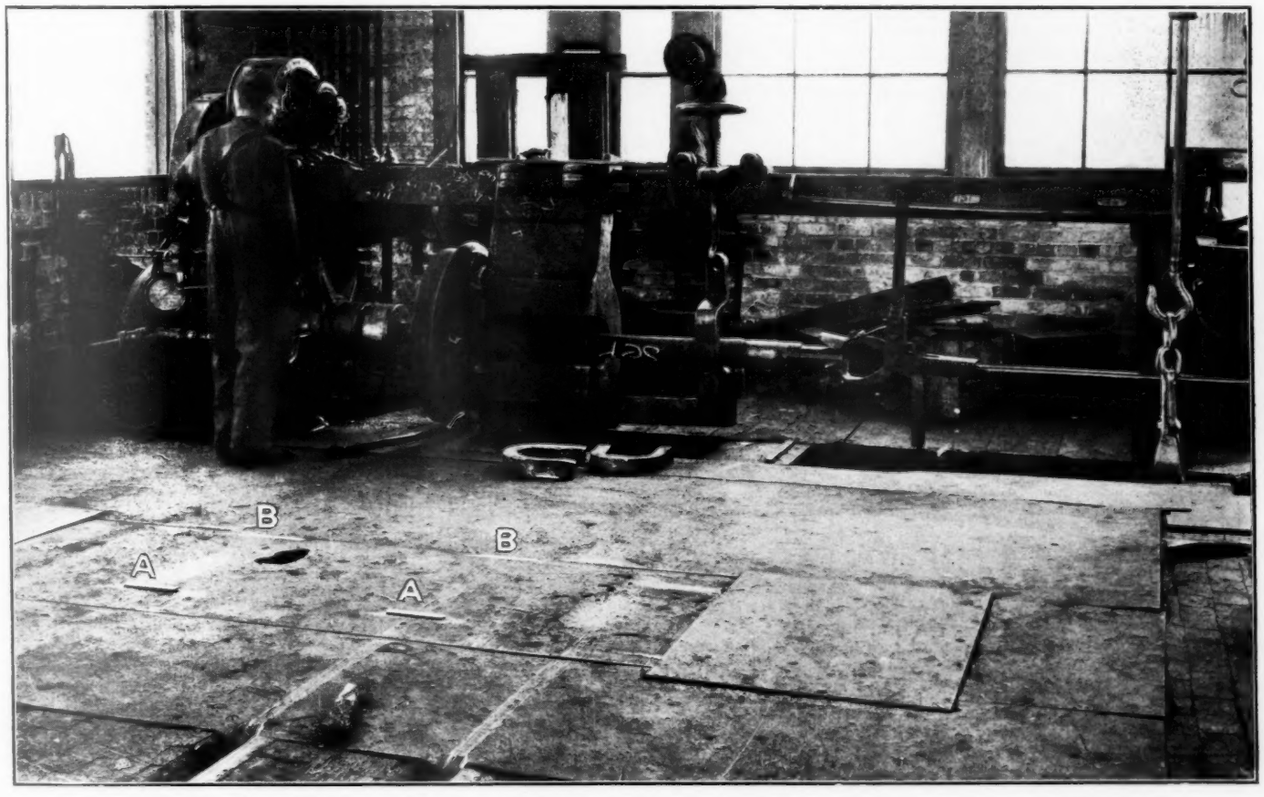


Fig. 1—Wheel Dismounting Press; Shifting Platform in the Foreground. Axle Carrier at the Right.

above the platform and operate valves controlling air cylinders under the floor. As the wheels roll on the platform

Another novel device is the carrier which is used for disposing of the scrap axles. Axles which are still serviceable are picked up by a jib crane and stored in the shop to be used again, while those which are to be discarded are put outside

*See *Railway Age Gazette, Mechanical Edition*, issue of January, 1914, page 33.

the shop. To reduce the labor of handling these scrap axles a hydraulically operated carriage has been designed. This carriage, which is illustrated in Fig. 2, runs on a track elevated about 2½ ft. from the floor. It is attached to an endless wire cable operated through gearing from a long cylinder and is thus driven in either direction. The handle controlling the cylinder is located at the end of the wheel press.

An ingenious arrangement is used for dropping the axles

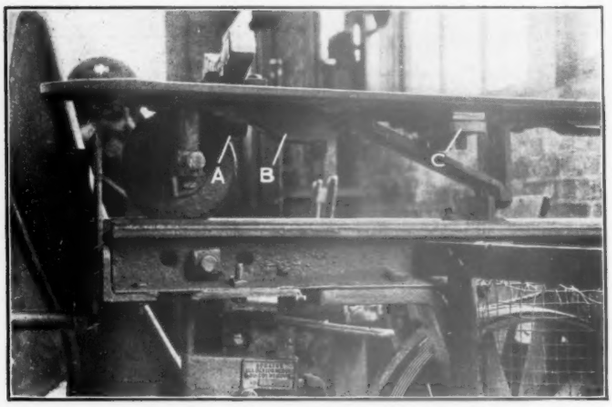


Fig. 3—Details of Device for Dumping Axles

at the proper position on the platform outside the shop. Above the floor of the axle carrier are a pair of supports on which the axle is placed. (See Fig. 2.) The top of these supports forms a broad V. The center is pivoted on an axis running lengthwise of the car and the portion which projects beneath the floor of the carrier has a lug on either side, shown at *A* in Fig. 3. Between the lugs and the floor of the carriage are wedge shaped members, *B*, extending under both supports. These are free to move longitudinally but are fastened to a link, *C*, pivoted at the center of the carriage. Thus when either member moves in one direction the other moves in the opposite direction, and the axle support is tipped to one side or the other.

Between the rails on which the carriage rolls, and extending its entire length, is a shaft operated by a crank in the shop, as shown at *A* in Fig. 2. This shaft carries four

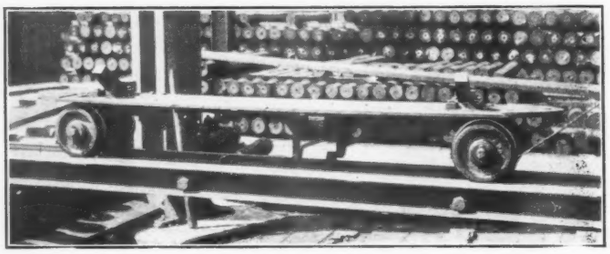
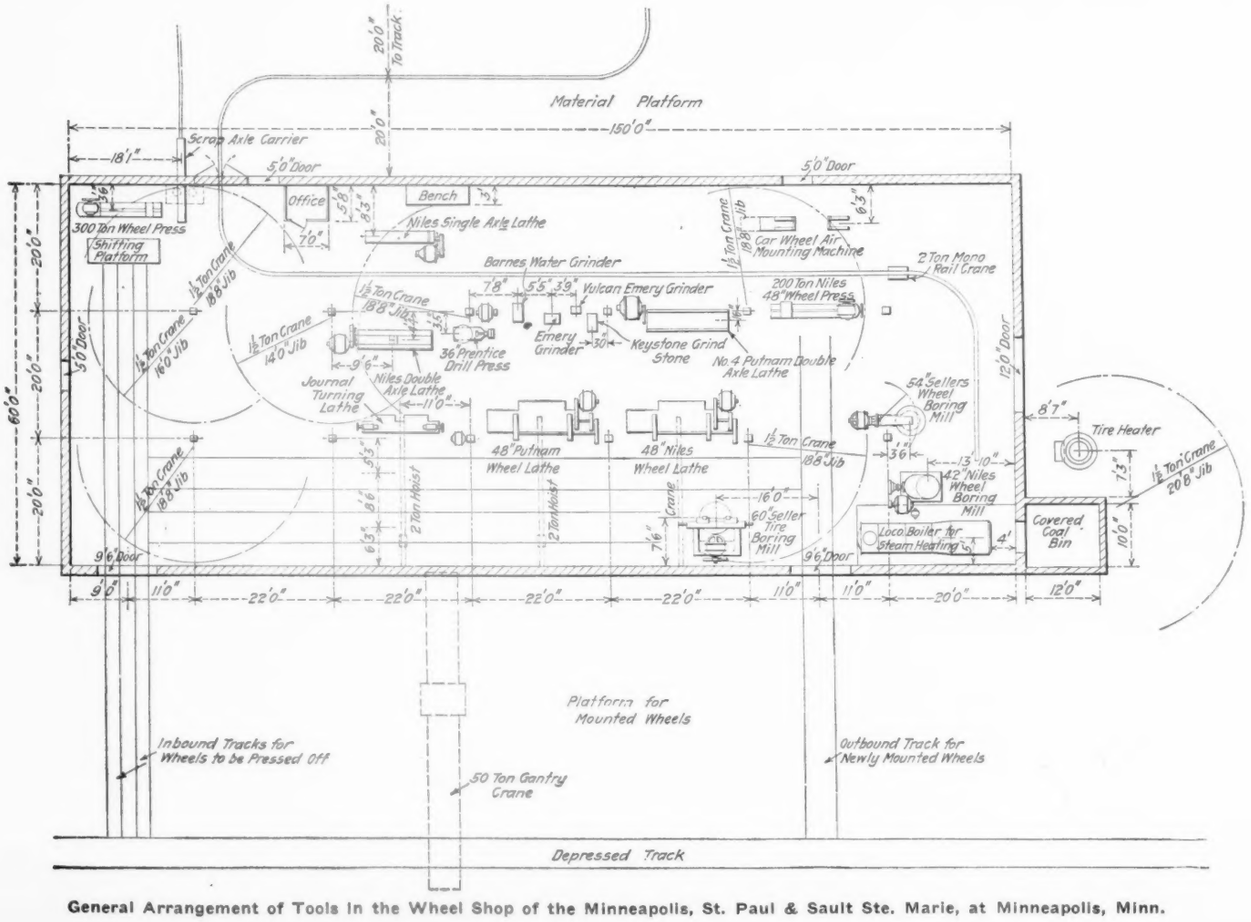


Fig. 4—View of Carrier Showing Position of Supports and Wedges After Discharging Axle

stops, spaced about nine feet apart. The dial at the end of the shaft has eight positions, two for each stop. When the dogs are placed at 45 deg. to the vertical on either side, they are in position to strike the wedges. When the carriage moves out and strikes the dog, the supports are tipped and the axle is discharged on one of eight piles, four on each side of the



General Arrangement of Tools in the Wheel Shop of the Minneapolis, St. Paul & Sault Ste. Marie, at Minneapolis, Minn.

track. The axle carrier is shown in Fig. 4 just after an axle has been dumped. The valve controlling the hydraulic cylinder is then reversed starting the carriage traveling back. When it reaches the shop a stop just above the rails, plainly

Fig. 5—Overhead Monorail Crane Serving Shop and Storage Platform

shown in Fig. 2, brings the support back to the normal position ready to receive another axle.

One of the noteworthy features of the layout of this shop is the overhead mono-rail crane Fig. 5 which serves the platform where new material is received and also the machines along two sides of the shop. The amount of trucking required has been largely reduced by the direct crane service from the material platform to the machines, which is made possible by placing large doors in the shop walls through which the crane passes.

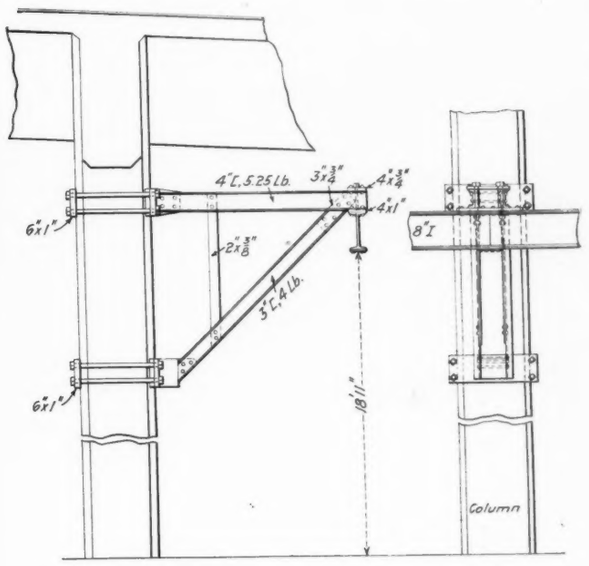
ENGINEHOUSE TROLLEY HOIST

BY E. A. M.

A scheme for attaching and supporting the tracks for a one-ton roundhouse trolley hoist is shown in the accompanying drawing. The details as shown are designed to suit the conditions in a concrete building, but the idea could be equally well adapted to enginehouses of other types of construction.

The essential feature is the cantilever support, which is built up of two 4-in., 5.25-lb. channel tension members and two 3-in., 4-lb. struts, the two members being joined at the outer end by means of ¼-in. gusset plates and attached to special castings at their inner ends, designed to conform to the shape of the pillar. The trolley track is an 8-in. I-beam, with flanges four inches wide, and where designed to span more than one stall, the ends are joined under the supporting truss by means of a 1-in. plate, riveted across the lower flanges of the 4-in. channel members of the truss and to the top flanges of the adjoining I-beams. A short ¼-in. plate is attached by struts to the lower flanges of the channel. In order to conform to the circle of the house, the sections of the track over adjoining pits are placed at a slight angle to each other, which, however, is not sufficient to interfere with the proper operation of the hoist trolley.

It is frequently necessary to rig up a temporary suspension for a hoist to remove sand boxes and other parts from the top of the boiler. This requires considerable time and



Trolley Hoist Track Supported from Enginehouse Columns

is often very inconvenient. A trolley hoist spanning one or more stalls, as local conditions dictate, provides a convenient means for handling this class of work with a minimum expenditure of time.

Courtesy of New York World

Buy Bonds and Keep Him on the Run

SETTING ECCENTRICS BEFORE ENGINES ARE WHEELED

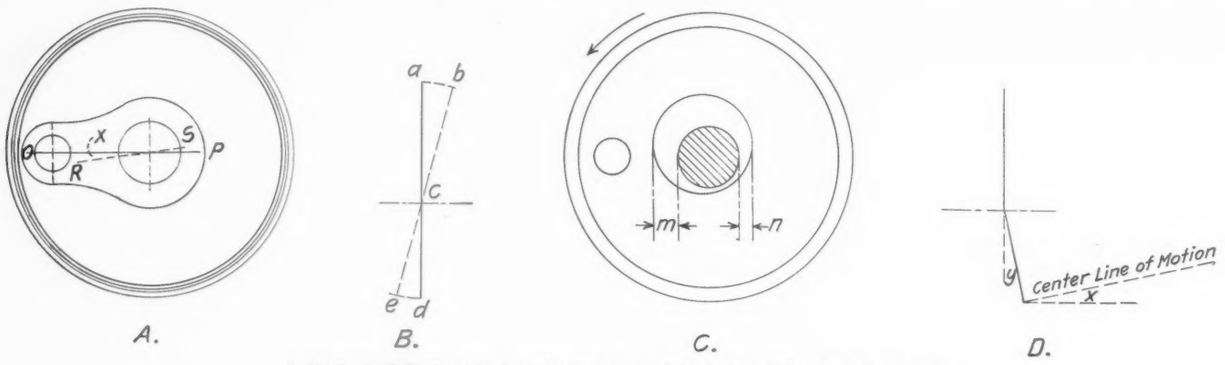
BY F. J. SCHENCK
Master Mechanic, Natalbany Lumber Company, Hammond, La.

It is still the practice in many shops to delay the setting of eccentrics on Stephenson valve motion until the engine is wheeled and the valves run over. This is usually at a time when the other work is nearly completed and the valve man is rushed to get the engine out of the shop. Much time can be saved by setting and keying the eccentrics before the engine is wheeled, not to mention the probability of getting a better job.

After measuring the lap of the valve and determining the lead wanted in full stroke, measure the length of the rocker arms and if of unequal length make full scale line drawing of the arms, as at *B* in the sketch, and lay off *ab* equal to the lap of the valve plus the lead. Draw the rocker arm in position *bce* and measure the distance *ed*. This is equal to the linear advance of the eccentric. If the rocker arms are of equal length, the linear advance of the eccentric is equal to the lap plus the lead.

Scribe line *OP* on the wheel through the center of the axle and the center of the crank pin, as shown at *A*, and place the crank pin on the center by leveling line *OP* with a spirit level. Place the eccentric in approximately proper position relative to the crank pin and drop lines over the eccentric and axle, as shown at *C*. If the rocker arms are indirect and the forward motion eccentric is being set, move the throw of the eccentric toward the crank pin until one-half the difference between *mn* is equal to *ed*. Mark the eccentric in this position and key to the axle.

If the lower rocker arm has backset as at *D*, the procedure is slightly different since, strictly speaking, the eccentric is set relative to the center line of motion, which is a line drawn through the center of the hole in the lower rocker arm and the center of the main axle when the top arm is vertical. Since the lower rocker arm is placed at right angles to the center line of motion, as at *D*, the angle which the center line of motion makes with the horizontal is equal to the angle the lower arm makes with the vertical; then angle *x* equals angle *y*. Draw the center line of motion *RS* through the center of the axle as shown at *A*, making the angle *x* equal angle *y*. Level the line *RS* instead of line *OP*, and proceed as before.

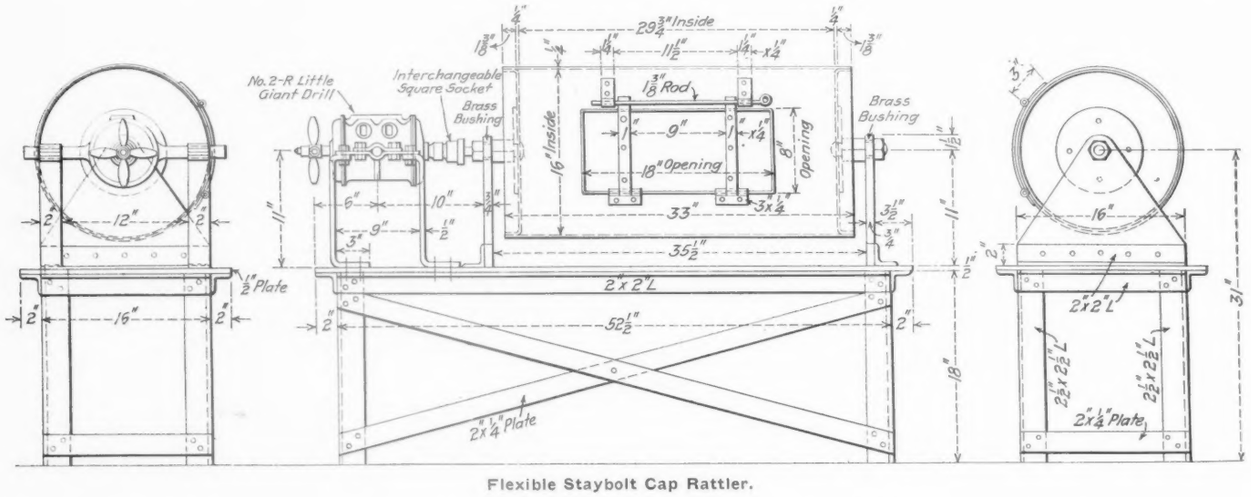


A Method of Fixing the Location of Eccentric Before Wheeling the Engine.

RATTLER FOR FLEXIBLE STAYBOLT CAPS

BY S. A. R.

In the drawing is shown a rattler which was designed especially for cleaning flexible staybolt caps. The drum is 16 in. in diameter by 29¾ in. long, inside, and is made of ¼-in. tank steel. Access to the interior is obtained through a door opening 8 in. wide by 18 in. long. The drum is mounted on brackets of ¾-in. plate, which in turn rest upon a table 31 in. high, built up of angle sections and plates. A No. 2-R Little Giant drill motor is used to drive the drum. The motor is supported by its handle, which rests in suitable brackets provided at one end of the table. The connection between the motor and the drum shaft is made by means of a square socket which slips over the square end of the shaft and is made with a standard tang to fit the drill socket. The bearings for the drum shaft in the supporting brackets are fitted with brass bushings.



Flexible Staybolt Cap Rattler.

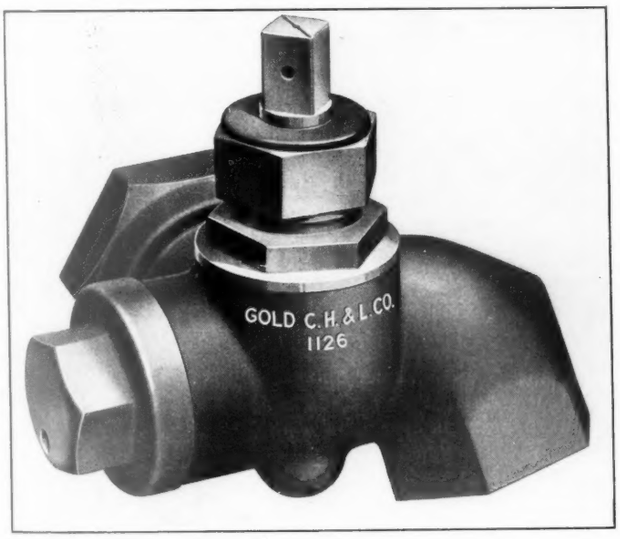
Make the Fourth Loan a Success!

NEW DEVICES

STEAM HEAT END VALVE WITH AUTOMATIC DRIP

In relieving the condensation at the rear end of passenger train heating lines the general practice has been to open the end valve slightly. This, however, has not proved satisfactory and many different schemes have been devised to take care of this drip automatically. All of these have been arranged to drain through the hose and have frequently caused freezing and decay of the hose. The Gold Car Heating & Lighting Company, New York, has recently developed a new end valve, known as the Acme valve No. 1126, in which the drip is automatically relieved through the valve itself, thus eliminating the continual dripping through the hose.

Referring to the sectional view of the valve, it will be seen that it is of the piston type, similar to existing Gold end



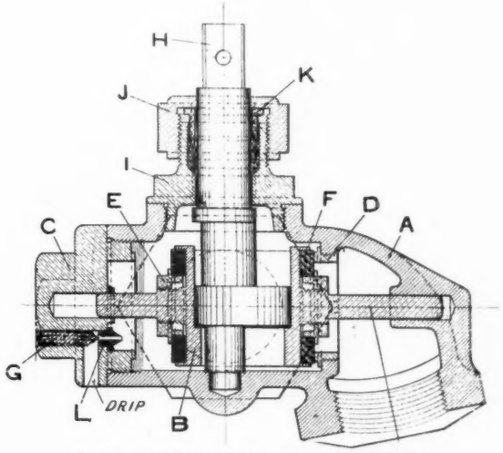
End Valve with Automatic Condensation Drip Port

valves. In this case the piston is double seated with a composition seat at each end. When the valve is closed, piston *B* is forced to the right by the cam on spindle *H*, thereby automatically opening the drip-port. When the valve is in the open position, the piston is forced to the left, the seat on this end forming a tight joint which automatically closes the drip-port. A quarter turn fully opens or closes the valve, and it cannot be jarred from its set position by the vibration of train, or unseated by the steam pressure. In the drip-port is provided an adjusting screw *G* for varying the opening.

The valve is substantially built, the body of iron and the cam and spindle cast in one piece. The spindle is short and of large diameter and should keep in perfect alinement for years. The area of the passage through it is so large that it offers less resistance to the flow of steam than the train line itself.

The seats of the valve are renewable and can be replaced without disconnecting any piping.

In addition to relieving the hose of the effect of the con-



Sectional View of the Acme End Valve

tinual drip incident to the relieving of the condensation through the hose coupling, it is also a protection to the trainmen when uncoupling the hose, as the opening between the train line and the hose is tightly closed when the valve is shut.

FORGED SUPERHEATER RETURN BENDS

The Locomotive Superheater Company, New York, a short time ago perfected a process of forging or swaging the return bends on superheater units from the unit pipes without

Steps in Forming Forged Return Bends in Superheater Units

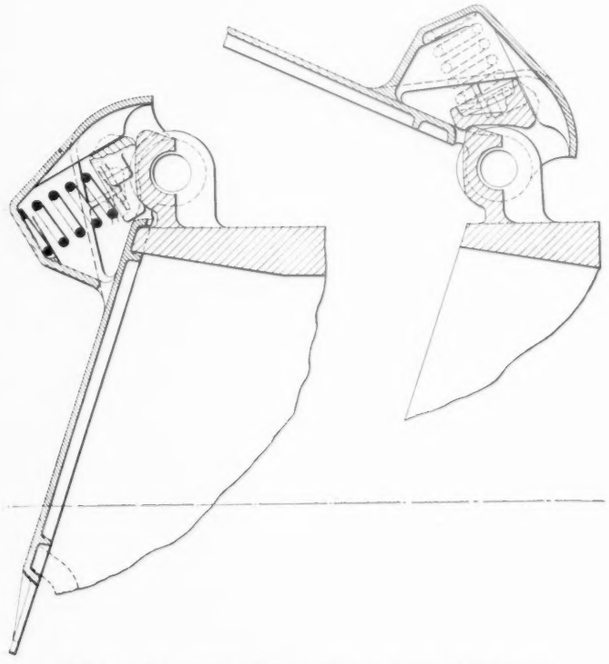
the use of any form of autogenous welding. The steps in the process are shown in the illustration. The first step splits and machine-welds the ends of the pipes together and is

carried on in a forging machine. The next step forms what is known as a preliminary swage and the return bend is then placed in a special swaging or forging machine and the completed bend is formed. The final step consists of cutting off the short extended butt, pressing the return bend back into shape so that there is no greater thickness than the outside diameter of the pipe, and smoothing the end off with an air hammer. The cut sections show the character of the completed return bends. As previously stated, there is no oxy-acetylene or electric welding used, the entire process being a machine forging job. These return bends are formed on the long pipes of the units and not on short ones as shown in the illustration, these short pipes being employed merely for the purpose of illustrating the process. Each unit thus becomes a continuous pipe from the saturated to the superheated steam chambers of the header.

JOLIET JOURNAL BOX

A journal box with a new type of lid combining several desirable features is now being manufactured by the Joliet Railway Supply Company, Chicago. The important points of the design of this box are the complete sealing of the outer opening of the box by the lid, the use of a spiral spring for holding the lid in place, and the interchangeability of the standard M. C. B. box lid.

The complete seal on the outer edges of the Joliet journal box, with flanges on the lid both inside and outside, makes the lid dust and water proof. This is made possible



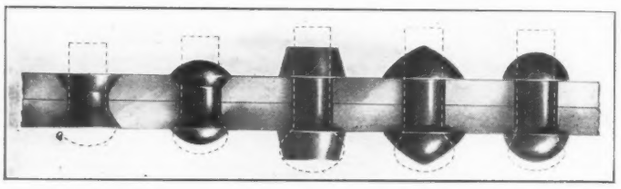
Lid of Joliet Journal Box in Open and Closed Positions

by placing the lid operating mechanism beyond the face of the box. A spiral spring and shoe are placed in a cap at the top of the lid. The shoe bears on the lug which is of a contour similar to that of the lug on the standard M. C. B. journal box. The arrangement is such that the spring holds the box firmly in either the open or the closed position. In case the original lid becomes broken or lost, the standard M. C. B. journal box lid can be applied.

New Locomotives.—The Railroad Administration will soon place orders for locomotives for 1919 delivery.

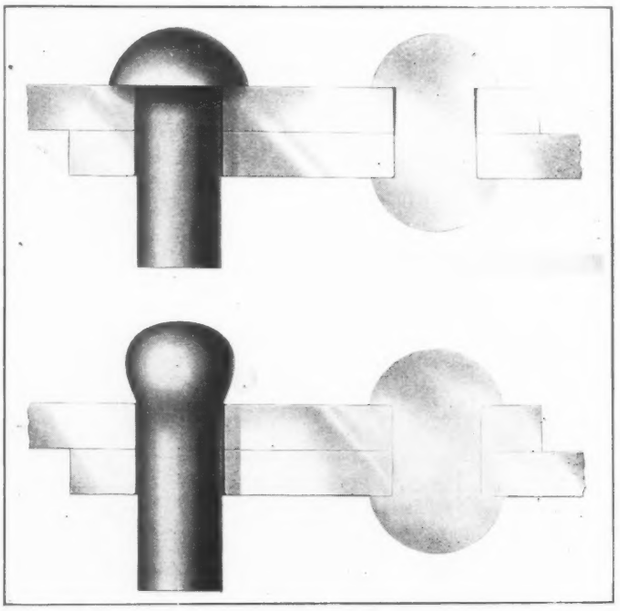
TIGHT RIVETS

The American Flexible Bolt Company, Pittsburgh, Pa., has recently placed on the market a new type of rivet called the "American" rivet. It has a rounded head, which when driven into the work will more completely fill the rivet hole than the ordinary type of rivet. One of the illustrations



Various Types of Heads Can Be Formed from the One Head of the "American" Rivet

shows actual photographs of sections cut through riveted plates, in which both the ordinary type of rivet and the "American" rivet were used. With the ordinary type of rivet it is practically impossible to upset the metal directly under the head on account of the square shoulder. With the "American" rivet the metal is made to flow under the head



Sections Through Plates Riveted by the Ordinary Type of Rivet and the "American" Rivet Showing How the "American" Rivet Completely Fills the Rivet Hole

and fill the rivet hole as the head is upset in the process of riveting. By thus filling the rivet holes more perfectly, the "American" rivet requires less calking and less stock is required to form the different types of heads. No sharp corners are formed in its manufacture to weaken it. Any desired shape of head may be obtained from the one stock pattern.

An Unusual Air Compressor.—Paradoxical as it may seem, there is a two-stage steam-driven air compressor at Newport, R. I., that shows a volumetric efficiency of 116.8 per cent, as shown in the records of tests on file in Washington. The reason is given by a writer in Power as follows: The cold-air inlet is a long pipe extending to the river bank, and when suction starts in the compressor it sets in motion the long column of air in the inlet pipe, the momentum of which partly compresses the air in the low-pressure cylinder before the inlet valves are completely closed.

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WE GUARANTEE, that of this issue 7,000 copies were printed; that of these 7,000 copies 6,086 were mailed to regular paid subscribers, 60 were provided for counter and news companies' sales, 191 were mailed to advertisers, 65 were mailed to employees and correspondents, and 598 were provided for new subscriptions, samples, copies lost in the mail and office use; that the total copies printed this year to date were 77,750, an average of 7,775 copies a month.

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ANNOUNCEMENT

Because it is necessary to conserve fuel, transportation and materials, the War Industries Board has limited the available paper supply; has asked us to discontinue subscriptions upon expiration unless they are renewed and paid for; cut down office supply, advertisers' copies and eliminate every source of needless waste. This order becomes effective at once.

We gladly comply with the full instructions from the War Industries Board with the full assurance that our subscribers and advertisers will give us every co-operation. We urge our subscribers particularly to watch the expiration date of their subscription since it will be impossible to continue their subscription after expiration or furnish back copies in case it lapses.

The Western Railway Club, at its meeting on September 16, elected L. P. Michael, chief draftsman, Chicago & North Western, second vice-president and A. F. Stuebing, associate editor *Railway Mechanical Engineer,* secretary and treasurer to fill out unexpired terms.

L. S. Carroll and F. A. Bushnell, members of the regional purchasing committee for Northwestern railroads, left Chicago on August 7 for an extended trip throughout the Northwestern region for the purpose of investigating the organization and practices of the store departments of the roads under federal control in that section of the country.

The Master Car Builders' rules of interchange, as revised June, 1917, have been extended to remain in effect until further notice. This announcement is made in circular No. 14 issued August 26. The extension applies also to circulars interpreting or modifying the 1917 rules. Notice will be given in advance of the date on which the 1918 code of rules is to go into effect.

Studies are being made by the United States Railroad Administration to determine whether the adoption of an equitable and universal plan for the compensation of employees, in case of injury or death, and provision of life, health and old age insurance is practicable. There are difficulties in the way arising from the existence of the present pension and insurance plans, but it is expected that they can be overcome.

The shopmen of the Louisville & Nashville have been "organized," and, according to a Louisville paper, about 97 per cent of the several thousand men in the different shops of the road have joined unions representing their several crafts. The men will work under what is called the Southeast agreement, and papers were signed on August 15 by the superintendent of machinery, representing the road, and by leaders of the several crafts.

M. C. B. Questionnaire on the Use of Wood in Car Construction

The Master Car Builders' Association, acting in conjunction with the American Wood Preservers' Association and the Forest Products Laboratory of the United States Forest Service, has sent to the members a circular asking for information necessary to permit a thorough study of the proper utilization of wood in car construction and the development of methods of protecting timber against decay. The questionnaire also asks for data concerning the results obtained by using hard woods and uncommon species of wood in car building, the efforts made to save old car lumber and the comparative life of single sheathed and double sheathed box cars of similar weight and capacity.

Government Interested in Carbocoal

The United States Fuel Administration has issued press notices to the effect that the United States Government has become interested in the establishment of a plant for the manufacture of Carbocoal at Clinchfield, Va. The plant, which is now in the preliminary stages of construction, will have a capacity of treating several hundred thousand tons of bituminous coal annually. The plans for the plant and the grounds allow for an eventual capacity of 1,500,000 tons per year. By a new process of low temperature distillation, invented by Charles H. Smith and described in the *Railway Mechanical Engineer* for March, page 175, bituminous coal is treated in such a manner as to recover greater quantities of the valuable by-products, such as toluol, sulphate of ammonia and valuable oils. From the residue is made a valuable smokeless fuel, in the form of briquettes. Tests of Carbocoal by the Navy disclose that it contains less than four

per cent volatile matter, rendering it practically smokeless. The new plant, which is expected to be in operation early in 1919, is being built near the junction of the Carolina, Clinchfield & Ohio and Norfolk & Western. The Fuel Administration and the Ordnance Bureau of the War Department are co-operating in the construction of the plant.

Results of M. C. B. and M. M. Letter Ballot

The outcome of the voting on questions ordered submitted to letter ballot at the annual meeting of the Master Car Builders' Association has been announced in Circular No. 7, issued by the secretary. All of the proposals submitted to a vote were carried. The most important matter considered was the adoption of the No. 10 contour line for the type D coupler. This was adopted with but a single dissenting vote. The design of the 6-in. by 8-in. shank for the type D coupler was also carried by a large majority. The gages to insure interchangeability of parts and specifications for the purchase and acceptance of couplers, knuckles, locks, and other parts were also adopted. The modifications of certain specifications proposed by the committee on Tests and Specifications for Material were carried. It was also voted to add to the interchange rules a provision making the use of metal safety blocks mandatory and prohibiting the use of wooden safety blocks. The remainder of the twenty-two questions related to minor changes in the standards and recommended practices of the association.

The twenty questions appearing on the letter ballot of the Master Mechanics' Association were all adopted. The majority of these were submitted by the Committee on Specifications and Tests for Material. Several new specifications were adopted as recommended practice and a number of others were revised. The overall width of journal bearings was increased and several of the recommended practices of the association were advanced to standard.

Revision of M. C. B. Rules for 1918-19

The changes in the Master Car Builders' Rules of Interchange for freight cars, for the coming year, proposed by the Arbitration Committee and referred to the Railroad Administration, have been passed on. The new rules as affecting bills for repairs went into effect on October 1, 1918, although they will probably not be in the hands of all the roads until some later date.

The rules have been retained as nearly as possible in the present form, so far as they apply to roads not under federal control. To take care of interchange between roads operated by the Railroad Administration, a preface has been added. Article I of the preface covers necessary changes in the rules to conform to Circular 7 of the Division of Operation. Article II provides for the elimination of defect carding between roads under federal control, while Article III eliminates billing for certain minor items between roads under federal control. Article IV covers the proper charges for re-weighing and stenciling cars belonging to government controlled roads.

The following list gives the items affected by the principal modifications in the rules: rule 3, section h, paragraph 2, covers the Railroad Administration's requirements with regard to standards for certain repairs; rule 7 provides for a standard original record of repairs made and the method of handling; rules 32 and 43, covering the responsibility for certain repairs, have been altered. Under rule 101 average credit prices have been provided for certain air brake parts and also for brake beams. The labor allowance for ordinary repair work has been raised to 58 cents an hour and for work on tanks of tank cars to 68 cents. Settlement prices for destroyed cars have been increased to meet present conditions. The percentage to be added to bills, as provided under rule 106, has been reduced from 35 to 30.

PERSONAL MENTION

FEDERAL ADMINISTRATION APPOINTMENTS

T. E. Paradise, division master mechanic and trainmaster on the Chicago, Burlington & Quincy, with headquarters at Centerville, Iowa, has been appointed mechanical assistant on the regional director's staff of the Central Western region, with headquarters at Chicago.

GENERAL

E. R. Battley, master mechanic of the Grand Trunk, at Montreal, Que., has been appointed superintendent of motive power, eastern lines, with headquarters at Montreal.

R. J. Needham has been appointed mechanical and electrical engineer of motive power and car departments of the Grand Trunk, with headquarters at Montreal, Que.

F. L. Carson, superintendent of motive power of the San Antonio & Arkansas Pass, has been appointed assistant mechanical superintendent under federal control, with headquarters at Yoakum, Tex.

William A. Cotton, chief clerk to the general mechanical superintendent of the Erie, has been appointed assistant to the general mechanical superintendent, with office at Meadville, Pa.

Willard Kells, assistant general superintendent of motive power of the Atlantic Coast Line, with office at Wilmington, N. C., has been appointed general superintendent of motive power, with headquarters at the same place, succeeding R. E. Smith. Mr. Kells was born on February 4, 1868, at Dennison, Ohio, and was educated in the grammar and high schools of Cleveland, Ohio. He began railway work on March 1, 1888, as a machinist apprentice with the Erie Railroad at Susquehanna, Pa., and later was promoted to gang foreman at Meadville, Pa. On October 1, 1893, he was appointed general foreman of the same shop and in January, 1896, was promoted to master mechanic, Mahoning division, with headquarters at Cleveland. In August, 1898, he was transferred as master mechanic to the Lima and Chicago divisions, with headquarters at Huntington, Ind. From February 1, 1899, to April 1, 1903, he was master mechanic of the Meadville division at Meadville, Pa., and on the latter date resigned from the service of the Erie to become assistant master car builder of the Union Tank Line, with office at New York. The following month he was appointed master mechanic of the Auburn, Pennsylvania and Seneca divisions of the Lehigh Valley, with headquarters at Sayre, Pa. He was later transferred to Buffalo, N. Y., in the same capacity and was given supervision of all divisions in New York State. He resigned from the service of the Lehigh Valley in December, 1910, to go to the Atlantic Coast Line as assistant to the general superintendent of motive power, with headquarters at Wilmington, N. C., and one

W. Kells

year later was appointed assistant general superintendent of motive power, which position he held until his recent appointment.

M. C. FULLER, traveling fireman of the Minneapolis, St. Paul & Sault Ste. Marie, has been appointed assistant fuel supervisor.

J. C. GARDEN has been appointed superintendent of motive power shops of the Grand Trunk at Stratford, Ont.

RAYMOND A. GREENE, formerly a chemist with Armour & Co., Chicago, has been appointed chemist and engineer of tests of the Chicago & Alton, with headquarters at Bloomington, Ill.

J. HORRIGAN, superintendent of motive power of the Elgin, Joliet & Eastern, at Joliet, Ill., has been appointed superintendent of motive power also of the Chicago, Milwaukee & Gary.

J. R. LECKIE, assistant master mechanic of the Grand Trunk, at London, Ont., has been appointed assistant to the superintendent of motive power of the Ontario lines, with headquarters at London.

A. C. LONGDO has been appointed assistant fuel supervisor of the Minneapolis, St. Paul & Sault Ste. Marie.

M. P. LYBECK has been appointed assistant fuel supervisor of the Minneapolis, St. Paul & Sault Ste. Marie.

F. W. MAHL, director of purchases of the Southern Pacific, Pacific System, at New York, has been appointed corporate mechanical engineer of the Southern Pacific lines west of El Paso and Ogden, with headquarters at San Francisco, Cal.

GEORGE MCCORMICK, superintendent of motive power of the Southern Pacific, now also has jurisdiction over the Western Pacific, the Tidewater Southern and the Deep Creek Railroad, with headquarters at San Francisco, Cal.

D. J. MCCUAIG, master mechanic of the Grand Trunk at Toronto, Ont., has been appointed superintendent of motive power of the Ontario lines, with office at Toronto.

A. MCDONALD, assistant master mechanic of the Grand Trunk at Montreal, Que., has been appointed assistant to superintendent of motive power, with office at the Montreal shops.

C. E. PECK, master mechanic of the Southern Pacific at Brooklyn, Ore., has been appointed assistant superintendent motive power of the Oregon-Washington Railroad & Navigation Company, with headquarters at Portland, Ore., succeeding J. T. Langley, resigned to accept service elsewhere.

J. A. POWER, assistant general manager of the Southern Pacific, Texas Lines, has been appointed mechanical superintendent of all lines under the authority of W. B. Scott, federal manager, with headquarters at Houston, Tex.

J. R. POTTER, traveling fireman, has been promoted to assistant fuel supervisor of the Minneapolis, St. Paul & Sault Ste. Marie.

R. E. ROE, general master mechanic of the Gulf Coast Lines, has been appointed assistant mechanical superintendent of the New Orleans, Texas & Mexico, the Beaumont, Sour Lake & Western and the St. Louis, Brownsville & Mexico, with office at Kingsville, Tex.

J. VASS, assistant master mechanic of the Grand Trunk at Allandale, Ont., has been appointed assistant to the superintendent of motive power of the Ontario lines, with headquarters at Allandale.

A. D. WILLIAMS, superintendent motive power of the Southern Pacific, Northern district, now also has jurisdiction over the Western Pacific, Tidewater Southern and Deep Creek Railroads, with headquarters at Sacramento, Cal.

G. M. WILSON, master mechanic at the Montreal locomotive shops of the Grank Trunk, has been appointed superintendent of motive power shops at Montreal, Que.

A. WOODHALL has been appointed assistant fuel supervisor of the Minneapolis, St. Paul & Sault Ste. Marie.

MASTER MECHANICS AND ROAD FOREMEN OF ENGINES

J. J. DOWLING, general master mechanic of the Great Northern, with headquarters at Great Falls, Mont., has been appointed general master mechanic of the Eastern district, with headquarters at St. Paul, Minn., succeeding G. A. Bruce, deceased.

A. B. FORD, division master mechanic of the Great Northern at Great Falls, Mont., has been promoted to general master mechanic, with headquarters at Great Falls, to succeed J. J. Dowling, transferred.

MICHAEL A. GLEESON, whose appointment as master mechanic of the Baltimore & Ohio at New Castle Junction, Pa., was announced in the *Railway Mechanical Engineer* last month, was born at Piedmont, W. Va., on November 6, 1885, and was educated at St. Peter's School, Westernport, Md. His entire railroad service has been with the Baltimore & Ohio. He was employed in September, 1901, as an engine cleaner, later for eight years was a machinist, and in September, 1914, he was made a foreman. In February, 1916, he was promoted to the position of general foreman at Grafton, W. Va.; a year later he was transferred to Keyser, W. Va., and several months later to Philadelphia, Pa. In December, 1917, he was appointed assistant master mechanic at New Castle Junction, and held this position until he received his recent appointment.

D. M. MCLAUCHLAN, assistant master mechanic of the Southern Pacific at Brooklyn, Ore., has been appointed master mechanic on the Portland division, succeeding C. E. Peck, resigned to go to another road.

J. A. MCNULTY, railroad representative of the Anchor Packing Company at Chicago, has been appointed division master mechanic of the Chicago, Milwaukee & St. Paul at Dubuque, Iowa, succeeding G. T. Messer.

R. J. SPORSELLER has been appointed road foreman of engines on the Pennsylvania Railroad, Western lines, with headquarters at Lancaster, Ohio, to succeed J. L. Todhunter, transferred.

CAR DEPARTMENT

F. D. CAMPBELL, general car foreman of the Chicago, Milwaukee & St. Paul at Tacoma, Wash., has been appointed assistant master car builder of the lines west of Mobridge, S. D., with headquarters at Tacoma, Wash.

W. L. DELANEY, car foreman of the Chicago, Milwaukee & St. Paul at Tacoma, Wash., has been appointed general car foreman at that point.

W. G. DENSMORE, car foreman of the Chicago, Milwaukee & St. Paul at Miles City, Mont., has been appointed general car foreman at that point.

CLYDE MEDLEY, assistant general car foreman of the Chicago, Milwaukee & St. Paul at Miles City, Mont., has been appointed general car foreman, with headquarters at Seattle, Wash.

FRANK D. SHOOK, car foreman of the Chicago, Milwaukee & St. Paul, has been appointed general car foreman at Spokane, Wash.

A. STRAND, car foreman of the Chicago, Milwaukee & St. Paul at Deer Lodge, Mont., has been appointed general car foreman at that point.

C. C. Witts, car foreman of the Chicago, Milwaukee & St. Paul at Malden, Wash., has been appointed general car foreman at Harlowton, Mont.

SHOP AND ENGINEHOUSE

O. C. Coho has been transferred to the Pitcairn, Pa., enginehouse of the Pennsylvania Railroad as foreman, succeeding O. L. Zimmerman.

G. H. Gjertsen has been appointed master welder of the Northern Pacific, in charge of electric and oxy-acetylene welding and cutting.

W. B. Mellon, assistant foreman of the Pennsylvania at the Twenty-eighth street shops, Pittsburgh, Pa., has been appointed enginehouse foreman of the same road at Youngwood, Pa.

F. Ravena, roundhouse foreman of the Erie Railroad at Cleveland, Ohio, has been promoted to general foreman.

F. Svec, fitting shop foreman at the Cleveland, Ohio, shops of the Erie Railroad, has been promoted to erecting shop foreman.

O. L. Zimmerman, enginehouse foreman of the Pennsylvania Railroad at Pitcairn, Pa., has been transferred to Derry, Pa., as enginehouse foreman.

PURCHASING AND STOREKEEPING

E. T. Burnett will perform the duties of purchasing agent of the Norfolk & Western until further notice, in addition to his duties as chairman of the Regional Purchasing Committee for the Pocahontas Region.

H. E. Dutton, purchasing agent of the Green Bay & Western, has been appointed purchasing agent also of the Kewanee, Green Bay & Western, the Ahnapec & Western and the Waupaca-Green Bay, with headquarters at Green Bay, Wis.

C. H. Kenzel, purchasing agent of the Elgin, Joliet & Eastern at Chicago, has been appointed purchasing agent also of the Chicago, Milwaukee & Gary.

A. S. McKelligon, general storekeeper of the Southern Pacific, with headquarters at San Francisco, Cal., has had his jurisdiction extended over the Western Pacific, the Tidewater Southern and the Deep Creek.

H. C. Robinson has been appointed purchasing agent of the Chicago Junction and the Chicago River & Indiana, with office at the Union stockyards, Chicago, succeeding S. Salter.

G. W. Saul, purchasing agent of the Oregon-Washington Railroad & Navigation lines and the Yakima Valley Transportation Company, has been appointed purchasing agent also of the Northern Pacific Terminal of Oregon and the Pacific Coast, with headquarters at Portland, Ore.

F. W. Taylor, purchasing agent of the Southern Pacific Company at San Francisco, Cal., has been appointed purchasing agent of the Southern Pacific system, lines south of Ashland, Ore., the Western Pacific, the Tidewater Southern and the Deep Creek.

J. M. Wagner has been appointed purchasing agent of the Copper Range and will make his headquarters at Houghton, Mich.

W. C. Weldon, purchasing agent of the Colorado & Southern, has had his jurisdiction extended to include the Denver & Salt Lake, with headquarters at Denver, Colo., succeeding A. L. Cochrane.

L. B. Wood, purchasing agent and general storekeeper of the Southern Pacific, Texas lines, has been appointed general storekeeper of all lines under W. B. Scott, federal manager, with headquarters at Houston, Tex.

OBITUARY

G. A. Bruce, general master mechanic of the Great Northern, Eastern district, with headquarters at St. Paul, Minn., died on August 26, at Minot, N. D.

C. W. Van Buren, who was killed in an automobile accident on August 25, at Canajoharie, N. Y., as was mentioned in these columns last month, was born on October 18, 1867, in Rensselaer County, N. Y. He was educated in the common schools, later attending night school in New York City. In 1889, he began railway work on the New York Central & Hudson River, and served as a carpenter at the West Albany shops until 1891. He was then appointed foreman; and two years later was given charge of the car department work on the Adirondack division at Herkimer, N. Y. In 1896, he was transferred to Utica in charge of car department work on the Adirondack and Mohawk divisions of the same road and the West Shore. He entered the service of the Canadian Pacific in July, 1905, as general inspector on the lines east of Port Arthur. The following year he was appointed divisional car foreman of the Eastern division, remaining in that position until July, 1909. He then served as master car builder of the Eastern lines of the same road at Montreal until May, 1911, and then went to the Union Stock Yard & Transit Company, Chicago, as assistant general superintendent, remaining in that position until January, 1915, and was then appointed general foreman of the Milwaukee Refrigerator Transit & Car Company at Milwaukee, Wis. In April, 1915, he returned to the service of the Canadian Pacific as general master car builder, which position he held until the time of his death.

Robert E. Smith, general superintendent of motive power of the Atlantic Coast Line, with office at Wilmington, N. C., was instantly killed on August 25 by the accidental discharge of a rifle which he was cleaning and it is supposed that he was not aware that the rifle was loaded. He was born on February 11, 1862, at Reading, Pa., and graduated from Phillips Academy, Andover, Mass., in the class of 1882. He began railway work later in the same year as a machinist apprentice on on the Philadelphia & Reading. From 1885, to November of the following year, he was a draftsman on the Norfolk & Western, and then to October, 1890, was foreman of the same road at Norfolk, Va. He subsequently served as road foreman of engines for about two years and from 1892 to January, 1896, was general foreman of the Lambert Point shops of the same road. In January, 1896, he entered the service of the Atlantic Coast Line as fuel agent, and in February of the following year was appointed superintendent of motive power of the same road. From July, 1898, to March, 1905, he served as assistant to the general manager and since that time had been general superintendent of motive power.

R. E. Smith

Condition of Germany's Rolling Stock.—Writing in the Berliner Tageblatt on the present conditions of Germany's rolling stock, Herr Gothein, the Reichstag Deputy, says that of his many railway journeys during the last two years one out of every five was interrupted by engine breakdowns.

SUPPLY TRADE NOTES

Fred G. Zimmerman, assistant to the secretary of Harry Vissering & Co., and the Okadee Company, has been appointed acting secretary, succeeding Marshall E. Keg, granted a leave of absence.

F. J. O'Brien, mill manager at Milwaukee, Wis., for the Globe Seamless Tube Company of Chicago, was promoted on September 1 to general manager, with headquarters at Milwaukee. He began his business career as a stenographer in the manufacturing department of the Pullman Company in 1894. He was subsequently chief clerk to the general manager and manager of the sales department. In 1906 he left the Pullman Company to become sales representative of the Kirby Equipment Company, remaining with that company until 1910 when he became identified with the Globe Seamless Steel Tubes Company as sales representative. He was promoted to general sales manager in 1914, and in April, 1917, was appointed manager of mills, with headquarters at Milwaukee.

F. J. O'Brien

James A. Trainor, formerly assistant to the sales manager of the Baldwin Locomotive Works, has been appointed assistant general sales manager of the American Flexible Bolt Company, with offices at 50 Church street, New York. Mr. Trainor started his business life with the Baldwin Locomotive Works and worked his way up through various departments to the position of assistant to the sales manager. In November, 1917, he entered the service of the United States government as a major in the Russian Railway Service Corps. This organization was sent to Russia to operate the Trans-Siberian Railway. Owing to the upheaval in Russia, part of this organization was recalled to the United States and Mr. Trainor again entered the service of the Baldwin Locomotive Works, resuming his position as assistant to sales manager, which position he held at the time of his recent appointment.

J. A. Trainor

The Bettendorf Company announces the closing of its sales offices in Chicago and New York on September 1. Requests or communications to the company should be referred to the home office at Bettendorf, Iowa.

J. C. Weedon has been appointed railroad representative for the Anchor Packing Company, with headquarters at Chicago, to succeed J. A. McNulty.

E. P. Dillon, manager, power division, of the Westinghouse Electric & Manufacturing Company, at New York, has resigned to become general manager of the Research Corporation, New York.

The American Flexible Bolt Company of Pittsburgh, Pa., has opened a branch office at Cleveland, Ohio, in charge of L. W. Widmeier, who was formerly assistant general sales manager at the company's New York office.

L. C. Sprague, special railroad sales representative of the Chicago Pneumatic Tool Company, with headquarters at Chicago, has been promoted to district manager of sales for that company, at New York, succeeding Charles Booth, resigned. C. W. Cross succeeds Mr. Sprague.

B. H. Tripp, special representative of the Chicago Pneumatic Tool Company on the Pacific coast, has been appointed district manager of sales for the Pacific coast territory, with headquarters at San Francisco, Cal., succeeding M. W. Priseler. The Los Angeles branch of the company will also come under Mr. Tripp's jurisdiction.

J. H. Rodger has been elected acting vice-president of the Safety Car Heating & Lighting Company, with office at Chicago. Mr. Rodger has been sales representative with that company since April, 1911, prior to which he was with the Standard Coupler Company and the Monarch Machine Company. A. Clark Moore, vice-president of the Safety Car Heating & Lighting Company, whom he succeeds, has been given a leave of absence for the duration of the war to accept a commission as major, in charge of aircraft production in the New York district. Major Moore was born January 18, 1880, and entered the railway supply business in the New York office of the Safety Car Heating & Lighting Company in July, 1899. In 1906 he went with the Western Steel Car & Foundry Company and later with McCord & Co., returning to the Safety Car Heating & Lighting Company in August, 1907, remaining with that company in the positions of sales agent in New York, 1907; manager, Northwestern district, 1908; general manager, New York, 1911, and vice-president with headquarters in Chicago since June, 1913. Major Moore is a past president of the Railway Electrical Supply Manufacturers' Association.

J. H. Rodger

Harry L. Barnitz announces that he has severed his connection with the International Oxygen Company as sales agent and is now conducting business under his own name as consulting engineer on oxygen and hydrogen, plant installation and technical processes for their uses. His office is at 617 West 152nd street, New York.

Robert F. Carr, president of the Dearborn Chemical Company of Chicago, has been commissioned major on the general staff in the department of purchases, storage and traffic of the army, with headquarters at Washington, D. C. Major Carr will work in conjunction with Lieut. Col. W. R. Roberts in connection with the standardization of army equipment.

John W. Foyle, vice-president of the Gustin-Bacon Manufacturing Company, Kansas City, Mo., has accepted a commission as major in the Quartermaster Corps, and reported to Washington on September 1. Mr. Foyle had been with the Gustin-Bacon Manufacturing Company five years, prior to which he was with the Missouri, Kansas & Texas.

Guy E. Tripp, formerly Colonel United States Army and head of the production division of the Ordnance Department, has been promoted to the rank of Brigadier General in the United States Army, and placed in control of the offices having charge of the production of ordnance material in their respective sections of the country. The district chiefs will report direct to General Tripp, who is succeeded as head of the production division by Col. C. C. Jamieson. Previous to his connection with the Ordnance Department, General Tripp was chairman of the board of directors of the Westinghouse Electric & Manufacturing Co., at New York.

Guy E. Tripp

The assets of the Orenstein-Arthur Koppel Company of Koppel, Pa., were sold by the Alien Property Custodian in an auction at Pittsburgh, on August 12, to W. A. Chamberlain of Pittsburgh, acting for the Pressed Steel Car Company. The price paid was $1,312,000. Included in this sale were a number of subsidiary companies which were owned by the Koppel company.

Oscar F. Ostby, manager of sales of the Glazier Manufacturing Company of Rochester, N. Y., has been elected vice-president of that company, with headquarters as heretofore at 2736 Grand Central Terminal, New York. He will also continue to represent the Grip Nut Company of Chicago, and the White American Locomotive Sander Company of Roanoke, Va. The Glazier Manufacturing Company manufactures a complete line of oil headlights as well as a complete line of electric headlight cases and interiors. Mr. Ostby, besides having represented the company for about a year, has also been much interested in the locomotive headlight field in the past in the interest of the International Acetylene Association and through his connection with that association, strenuously combated the passage of headlight laws in several states which demanded electrical equipment only. He was born March 5, 1883, and received his education in the public schools of Providence, R. I. From 1901 to November, 1904, he was engaged in publicity work, following which he was connected with the Commercial Acetylene Railway Light & Signal Company, and later with the Refrigerator, Heater & Ventilator Car Company, serving with the latter as general manager. He has been one of the leading members of the Railway Supply Manufacturers' Association and was its president in 1915-1916.

O. F. Ostby

R. S. Brown, whose election to the position of vice-president of the G. M. Basford Company, was announced in these columns last month, has been with that company since its formation about two years ago. Mr. Brown was born in England, but came to this country in early life. He received his early education in the public schools of East Rutherford, N. J. After completing high school he went to Pratt Institute, Brooklyn, where he was graduated in 1909. On graduation he entered the service of the Erie Railroad as a special apprentice, working successively in the Meadville office of the mechanical engineer, in the Erie shops at Susquehanna, the office of the general mechanical superintendent at New York and the office of the purchasing agent at New York. On the formation of the G. M. Basford Company, Mr. Brown went with the new company as above noted.

R. S. Brown

E. O. Griffin has been elected vice-president and sales manager of the Rabok Paint Company, with headquarters at Houston, Tex. Mr. Griffin was born at Madison, N. C., on January 3, 1867. He entered railroad service as assistant to the master in chancery on the International & Great Northern in 1889, remaining in the service of that company in various capacities until 1905, when he went with the Missouri Pacific, returning in 1909 to the International & Great Northern. In December, 1916, he was appointed assistant to the president of the St. Louis-Southwestern Lines and on the reorganization of the St. Louis - Southwestern under federal control, he was appointed assistant purchasing agent for that part of the road between Texarkana, Ark., and St. Louis, Mo. In addition to directing the sales work of the Rabok Paint Company at Houston, Tex., he will represent the Southern Railway Supply & Equipment Company, manufacturers of a general line of railway hardware; the Scarritt Car Seat Company; the Harry Benjamin Equipment Company; the Byrnes Belting Company; the Aquart Manufacturing Company, manufacturers of coach cleaning compounds; the Falls Hollow Staybolt Iron Company; the Great Western Smelting & Refining Company; the Royal Waste Company, and Leo Krouse of Texarkana, a manufacturer of hardwood lumber and cross ties.

E. O. Griffin